8-2021

Tennessee's Voluntary Prekindergarten (VPK) Program and Kindergarten Achievement

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A dissertation

presented to

the faculty of the Department of Educational Leadership and Policy Analysis

East Tennessee State University

In partial fulfillment

of the requirements for the degree

Doctor of Education in Educational Leadership, concentration in Administrative Endorsement

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by

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August 2021

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Keywords: Tennessee voluntary pre-k, sustainability, intervention, easyCBM

ABSTRACT

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by

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The purpose of this quantitative study was to investigate whether there is a relationship between Tennessee's Voluntary Prekindergarten (VPK) program and kindergarten achievement. I compared the academic growth of who attended a VPK program to students in Title 1 schools who did not attend a VPK program. Kindergarten gives the first easyCBM assessment in the second semester of school. I compared the easyCBM scores of the students who attended a VPK program to the ones who did not attend a VPK program. This could reveal if attending the VPK program is related to the students' academic growth and the amount of intervention a student will need the second semester of kindergarten.

The upper-east Tennessee school system used in this study consisted of a high-quality prekindergarten program and high-quality schools. I examined a population of 628 kindergarten students. There were a total of 280 students who attended the VPK program and a total of 348 students who attended a Title 1 school and did not attend a VPK program. I was given permission from the school system to access the data. The easyCBM data was compiled by the performance excellence administrator and the director of early childhood of the school system. The data consisted of 3 consecutive years of data. The VPK students performed significantly better on the December easyCBM letter sounds, phoneme-segmenting, and math common core state standards

screener scores. There was no significant difference in the December easyCBM word reading frequency screener scores. The VPK students performed significantly better on the May easyCBM letter sounds screener scores. There was no significant difference in the May easyCBM phoneme-segmenting and word reading frequency screener scores. The VPK students made significant gains from the December easyCBM scores to the May easyCBM scores. There was not a significant difference in the gain scores of the VPK students and the Title 1 students who did not attend a VPK program.

DEDICATION

I want to dedicate this study to Yahweh, my God, my Daddy. This journey has been authored and guided by Yahweh. He knew the plans he had for me, plans to prosper me and not to harm me, plans to give me hope and a future. His plans were for more than myself but for others to see what can be accomplished through him. His plans superseded the plans I had for myself and I am eternally grateful.

I want to dedicate this study to my husband David and my children, Micah, Arianna, Kaia, and David ll. They sacrificed so much for me to accomplish this goal and they were my cheerleaders throughout this journey.

I want to dedicate this study to my church family, Jubilee World Outreach. They have supported me, prayed for me, and encouraged me throughout this journey.

I want to dedicate this study to my parents who have supported me, sacrificed time with me, prayed for me, and encouraged me. They never doubted my ability to finish strong and told me so every time they talked to me.

ACKNOWLEDGEMENTS

I want to begin by acknowledging Yahweh, my Lord and Savior. He guided each step upon step, added details a little at a time, shut doors he did not want me to enter and opened wide the ones he wanted me to walk through. He put people in place to provide every need before I even knew I would need them. He even put people in place to encourage me to walk in leadership before this opportunity became available. He knew ahead of time what he wanted me to do and put everything and everyone in place to help me be successful.

I want to acknowledge my husband David Thompson who took the vow to love me in good times and in bad times seriously. He stepped in and became a single parent throughout this journey. He did not complain and continuously encouraged me to keep working. His confidence in me never wavered and I am extremely grateful.

I want to acknowledge my pastors Kirby and Debra Hill. They saw leadership potential in me and pushed me to step out of my comfort zone. They put me on the path to begin this journey. I know pastor Kirby Hill is smiling down on me right now as I complete this journey. He saw more in me than I saw in myself. I love you Pastor Hill and I miss you.

I want to acknowledge Kingsport City School's leadership team. They created an opportunity for principals to encourage future leaders to advance their degrees. They desired to raise up leaders from within who would help complete their mission and vision for the system. They stood behind their promise to help those in the program. They provided the mentors, they provided extra time to complete the work, and they even provided opportunities to obtain leadership experience.

I want to acknowledge Dr. Virginia Foley the chair of my committee. From the beginning of this journey she has illustrated what leadership should look like. Through her leadership my confidence and academics have grown tremendously. She has encouraged me, corrected me, and refined me until I could see the leader within myself. My refining is not complete but I know she will be there when I need some wisdom or encouragement, even after this journey is complete.

Lastly, I would like to acknowledge my committee members Dr. Good and Dr. Boyd. They took the time to read and help my dissertation to be accurate. They spent many hours reading and helping me refine this work to its completion and I am extremely grateful.

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Chapter 1. Introduction

The influence of prekindergarten has been studied in part due to the amount of tax money spent annually to implement the program nationwide. The overall effectiveness has been documented in many historical studies (e.g. Dodge et al., 2017; Ramey, 2016; Schweinhart, 2016; Temple et al., 2000). This effectiveness has come into question due to a 2015 study known as the Vanderbilt Study conducted by Lipsey et al. While that study confirmed the effectiveness of prekindergarten for academic readiness upon entering kindergarten, it also found that the academic gains began to fade by the end of kindergarten (Lipsey et al., 2015). The study raised questions regarding the amount of money spent on a program without sustaining effects. Lipsey et al. determined if the prekindergarten program is high-quality then the academic gains will continue throughout the years. Pearman ll et al. (2019) used the same data from Lipsey et al., (2015) and found the prekindergarten academic gains are sustained if students attend a high-quality school and have highly effective teachers. The prekindergarten programs and school system used in this study are classified as high quality with highly effective teachers due to high growth scores on statewide achievement tests.

This study investigated the academic progress of kindergarten students in a northeast Tennessee school district who attended a VPK program and those in Title 1 schools who did not attend a prekindergarten program. The study is focused on the second half of kindergarten due to the organization of the kindergarten curriculum. The first semester of kindergarten is an introduction to basic academic skills. Many of these basic academic skills are learned in the prekindergarten school year. Every December,

easyCBM, a screening assessment, is conducted to determine if and how much a student needs intervention to help the student catch up academically. This study examined students from similar socioeconomic backgrounds. It was intended to analyze if students who did not go to prekindergarten needed less, more, or equal amounts of intervention as those who attended prekindergarten. This study also examined the academic growth students made in reading and math from December to May. The student growth of the prekindergarten students was compared to the student growth of those who did not attend prekindergarten.

Statement of Problem

Lipsey et al. (2015) found the prekindergarten academic gains diminish and fade away by the end of kindergarten. One theory proposed by Lipsey et al. was the amount of time teachers are required to spend catching up those who did not attend a prekindergarten program. They suggested the time the teachers are spending could be pulling instructional time from the students who attended a prekindergarten program. This teaching strategy could leave the prekindergarten students academically stagnant. Pearman ll et al. (2019) used the same data from the Vanderbilt Study and found the prekindergarten academic gains are sustained if students attend a high-quality school and have highly effective teachers. My study examined the academic performance of students coming from high quality voluntary prekindergarten (VPK) programs in a high-quality school system that has highly effective teachers. This environment was chosen in order to assess whether the VPK students are able to retain the academic gains by the second semester of kindergarten. I examined the easyCBM screening assessment scores and compared the students who attended the VPK program and those, from Title

1 schools, who did not attend a VPK program. My study investigated whether students who did not attend a VPK program needed more intervention than students who attended a VPK program. I compared the easyCBM scores of the students who attended a VPK program with the ones, from Title 1 schools, who did not attend a VPK program. This affirmed whether students who did not attend a VPK program were able to catch up academically to the ones who attended a VPK program. These data also illustrated whether the VPK students were able to sustain the academic gains they had achieved.

Significance of the Study

The findings of this study could reveal whether the VPK program is related to the amount of intervention low-income students need in kindergarten. This study could help illustrate if attending high quality schools and having highly effective teachers influence the sustainability of the VPK academic gains. The findings may influence the funding of the VPK programs and professional development, with coaching, for teachers to help them become highly effective.

Statement of Purpose

The purpose of this quantitative study was to investigate whether there is a significant relationship between participation in Tennessee's Voluntary Prekindergarten (VPK) program and kindergarten achievement. I compared the academic growth of who attended a VPK program to students in Title 1 schools who did not attend a VPK program. Kindergarten gives the first easyCBM assessment in the second semester of school. I compared the easyCBM scores of the students who attended a VPK program

to the ones who did not attend a VPK program. This could reveal if attending the VPK program is related to the students' academic growth and the amount of intervention a student will need the second semester of kindergarten.

Window of Opportunity

This study is based on the theory there is a window of opportunity, between 3 and 5 years of age, when there is a developmental advancement in executive function (Blair, 2016; Zelazo et al., 1996). Executive functioning is the inhibitory control, attention shifting, and working memory cognitive processes applied in goal directed activities, problems solving, and planning (Blair, 2016; Blair et al., 2007; Welsh et al., 2010). Nesbitt et al. (2015) stated a child's executive functioning skills begin in early childhood, advance considerably by the time the child goes to kindergarten, and then continue to grow throughout middle school and adolescence.

Research Questions

1. Is there a significant difference in the December easyCBM screener scores in letter sounds (LS) between Kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

2. Is there a significant difference in the December easyCBM screener scores in phoneme-segmenting (PS) between Kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

3. Is there a significant difference in the December easyCBM screener scores in word reading frequency (WRF) between Kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

4. Is there a significant difference in the December easyCBM screener scores in the math common core state standard (CCSS) between Kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

5. Is there a significant difference in the May easyCBM screener scores in letter sounds (LS) between Kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

6. Is there a significant difference in the May easyCBM screener scores in phoneme-segmenting (PS) between Kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

7. Is there a significant difference in the May easyCBM screener scores in word reading frequency (WRF) between Kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

8. Is there a significant difference in the easyCBM screener scores in letter sounds (LS) of VPK students taking the test in December and the scores of the same students taking the test again in May?

9. In Title I schools, is there a significant difference in easyCBM gain scores from December to May in letter sounds (LS) of kindergarten students who attended the Volunteer Pre-K program and kindergarten students who did not attend the program?

10. Is there a significant difference in the easyCBM screener scores in phoneme-segmenting (PS) of VPK students taking the test in December and the scores of the same students taking the test again in May?

11. In Title I schools, is there a significant difference in easyCBM gain scores from December to May in phoneme-segmenting (PS) of kindergarten students who attended the Volunteer Pre-K program and kindergarten students who did not attend the program?

12. Is there a significant difference in the easyCBM screener scores in word reading frequency (WRF) of VPK students taking the test in December and the scores of the same students taking the test again in May?

13. In Title I schools, is there a significant difference in easyCBM gain scores from December to May in word reading frequency (WRF) of kindergarten students who attended the Volunteer Pre-K program and kindergarten students who did not attend the program?

Definitions of Terms

The following is a list of terms to help ensure clarity and understanding of the language presented in this study:

1. Scaled-up prekindergarten program – This term is used to describe the use of various successful strategies of smaller prekindergarten programs on state wide or nationwide prekindergarten programs.
2. Tennessee Voluntary Prekindergarten program (VPK) - legislation that funds prekindergarten classrooms across the state of Tennessee. For the purposes of this study, it will be referred to as the VPK program.
3. The Vanderbilt study – This was a study conducted by Vanderbilt University's Peabody Research Institute and Tennessee Division of School Readiness and Early Learning (Lipsey et al., 2015). This study is referred to in the early childhood community as The Vanderbilt study. For the purposes of this dissertation, it will be referred to as The Vanderbilt study.

Limitations and Delimitations

A limitation for this study is the presence of a global pandemic that caused the closure of the schools within the study for the spring semester of 2019. Due to the pandemic, students attended school sporadically due to various exposure to the virus. Students were required to attend online, and many students did not attend due to technical difficulties. A delimitation for this study is the sample comes from only one suburban city school system. Therefore, results may not generalize to other settings.

Overview of Study

Chapter 1 contains a brief history of the issue being studied along with a statement of the problem. It also contains a description of why this study is significant and the purpose of this study. Chapter 1 includes the theoretical framework of the study

and research questions. Lastly, it contains the definitions of terms, limitations and delimitations of the study, along with a brief summary of each chapter's contents. Chapter 2 contains a literature review of relevant literature to enhance the understanding of the study.

Chapter 3 contains the methodology of the study. This includes the site selection, population and sample as well as a description of the population. Chapter 3 also includes data collection and data analysis strategies along with an assessment of quality and rigor.

Chapter 4 is a presentation of the findings of the study. The findings are separated by research question and contain acceptance or rejection of the null hypothesis with a brief description of why. Each research question has a corresponding visual illustrating the data collected during the study. Lastly, chapter 4 concludes a brief summary of the chapter.

Chapter 5 contains the conclusions of the study along with a discussion of my thoughts concerning the conclusions. Chapter 5 also discusses the implications for this study and recommendations for future research.

Chapter 2. Literature Review

Early childhood programs have been used for decades to combat the influence poverty has had on children's educational progress and development. This is based on the theory that early childhood intervention will influence outcomes in various developmental domains (Campbell et al., 2002). One main domain is the cognitive domain. The theory that early childhood intervention will influence outcomes indicates that long-term intervention will cause improvements about when and how children develop cognitive and language skills. The early childhood intervention theory is based on the idea that the brain is sensitive to environmental enrichment during early childhood (Yoshikawa et al., 2016). These skills are assessed with various standardized tests measuring language and literacy growth. Early childhood programs are also associated with enhancing parent involvement in their child's education, parent attitudes and expectations about their children, and parenting practices. Long term advantages to the programs are the changes to children's self-efficacy, ability to persevere, and perceived competence. In addition to all these, early childhood programs help to increase social skills (Reynolds et al., 2004).

Children born into poverty start school academically behind their non-impoverished peers (Pearman ll & Stanford University, 2020; Reardon & Portilla, 2016). In addition to their initial deficits, children from poverty face the growing barrier of ever-increasing rigor in most kindergarten programs (Bassok et al., 2016; Repko-Erwin, 2017). This disparity causes a rise in the achievement gap, not a reduction. Prekindergarten programs have been a tool used by many states and districts to combat the rising achievement gap. Nevertheless, the effectiveness, ability to close the

academic gap, and the sustainability of these programs are being questioned. There are many studies that show high academic gains upon entering kindergarten but only a few studies show that these gains were sustained throughout adulthood. Among these studies are the Head Start Impact study, the Abecedarian Project, the Perry Preschool Program, the Chicago Child Parent Centers (CPC) study, the North Carolina schools study, the Putnam County schools study, and the Tennessee Vanderbilt study. Of these documented longitudinal studies, only the Head Start Impact study, the North Carolina schools study, and the Tennessee Vanderbilt study are scaled up nationwide or statewide prekindergarten programs. Of these studies, some common elements of each program stand out as reasons for their success. The Abecedarian Project, the Perry Preschool Program, the Chicago Child Parent Centers (CPC) study, and the North Carolina schools study credit high-quality programs for their success. These programs have low student-teacher ratios, the teachers have at least a bachelor's degree in early childhood education, high amounts of teacher training and coaching, as well as an accredited curriculum. A study conducted by Pearman II et al. (2020), using the Tennessee Vanderbilt study data, also credited high-quality school systems that have programs in place that differentiate instruction and have high documented growth scores as a reason for student success. The prekindergarten students attended these high-quality prekindergarten programs and then entered a high-quality school system that continued their forward academic momentum. Lastly, The Abecedarian Project, the Perry Preschool Program, and the Chicago Child Parent Centers (CPC) study credited high levels of parent instruction and involvement. The instruction was not just at school but also in the homes, helping to build life skills and generational academic growth.

Influential Historical Figures in Early Childhood Education

Early childhood education began with a desire to help those living in poverty. Johann Friedrich Oberlin and Johann Pestalozzi were the first to open free schools for children under the age of five. Their desire was to educate the children, so they did not succumb to the same state of poverty as their family before them. Friedrick Froebel worked at the school founded by Pestalozzi. This experience inspired him to create kindergarten, a child's garden. The idea was to think of children as plants who needed nurturing and health. He speculated the education of children should be a developmental process. The kindergarten teachers would provide activities and games for the children that helped guide the children to develop outer and inner paths of understanding. The freedom of the learner to explore their environment and guide their own learning was essential to the kindergarten philosophy (Morgan, 2011).

Margarethe Schurz and Elizabeth Peabody are credited with establishing kindergarten programs in the United States. Schurz was the first to establish a German-speaking kindergarten and Peabody was the first to establish an English-speaking kindergarten. Schurz was a student of Froebel's and was encouraged by him to start a school in the United States based on the kindergarten principals. Schurz began her kindergarten program with her children and a few neighborhood children. From this, the kindergarten concept began to grow as an effective way to educate children. Peabody was looking for a way to teach young children and heard about Schurz's kindergarten. Peabody met with Schurz and she introduced Peabody to Froebel's kindergarten concept and gave her his book to read. Peabody was so fascinated with the kindergarten concept that she traveled to Europe to experience the kindergarten

classrooms first hand. Once she saw the structure, talked and trained with the teachers, she chose to bring English-speaking kindergarten to the United States. She spent the next few years traveling back and forth to Europe learning from the kindergarten teachers and recruiting them to come and teach in the United States. Once she became successful with establishing the kindergarten programs she was invited to lecture at various universities to discuss the programs. The idea was accepted by the middle class first, then began to infiltrate the public school system (Morgan, 2011).

Peabody was part of the Transcendentalists, which was a group that fought for the rights of African Americans, Native Americans, and women. The group was famous for their speeches at various functions. The subject of their speeches included antislavery, Native American human rights, and women's equal rights. They were highly motivated by the idea of kindergarten as a way to train children early. The kindergarten curriculum trained children on how to be kind to others and treat everyone equally. By the 1800s there was an increase in the kindergarten movement that spread all the way from the east coast to the west coast (Morgan, 2011).

John Dewey, a well-known philosopher in the field of education, was the founder of the Chicago Laboratory School. He theorized that children should be full participants and construct their own learning. He viewed children as changing and growing beings who required experiences of interest and personal involvement. He called for more of a child-centered approach (Dodd-Nufrio, 2011; Morgan, 2011). Dewey speculated children best develop socially when they are in a mixed-age group. Therefore, in his laboratory school, the first two years of school were combined into one classroom. This pre-primary classroom incorporated Froebel’s kindergarten ideals and methods with

Dewey's child-centered philosophy. In the winter months, the children would investigate and learn about their school and home environment. In the spring months, the children would investigate their outdoor environment. The children worked and played with more independence than children were allowed in a typical Froebel kindergarten classroom (Krohg & Slentz, 2011).

Maria Montessori began implementing her model of early childhood education around the same time as Dewey's child-centered approach. Similar to many of the early childhood philosophers, she began her work with impoverished children. Montessori was the first to advocate for an inclusion model. She was an Italian doctor who began her research on children who were considered mentally challenged. The children were orphans who were living in subpar conditions and did not have adequate food or lodging. Montessori began by teaching the staff how to care for the children. Once their basic needs were being taken care of, she began concentrating on creating manipulatives that helped advance the academics of the children. She speculated the children needed specific activities or manipulatives that met the children's individual needs. Montessori was an advocate for more one-on-one instruction than group instruction. She felt the children's instruction should be always guided by a director or teacher. She included the rituals of everyday activities, like mealtimes, to help teach various academic standards. Based on the success experienced with these children, Montessori theorized that children who are slow learners should be fully integrated into the general education classroom. Her work has helped to guide modern-day early childhood and special education guidelines (Morgan, 2011).

B. F. Skinner is the person most associated with behaviorism, which is the philosophy that the environment shapes how we behave and think. It is only with the changing of the environment that behaviors will change (Cook, 2017). Behaviorism began with Ivan Pavlov's study of animal behaviors. Pavlov studied dogs and their response to outside stimuli. During Pavlov's experiments, the salivary gland production of the dogs was measured with the ringing of a bell before and after the introduction of the outside stimuli, in this case, dog food. Pavlov introduced the food with the ringing of the bell and later rang the bell without the introduction of food. He observed that the dogs began to salivate at the sound of the bell, even without the food. His study showed a direct link between an animal's nervous system and outside stimuli. Pavlov was able to control the response of the dogs by changing the environment, otherwise known as classic conditioning. Skinner took this idea of classical conditioning and developed the idea of behavior modification. Skinner theorized that if you paired the desired behavior with positive outside stimuli it would create either a rejection or retention of the behavior. When learners receive positive feedback, they are more likely to repeat the appropriate behavior. The opposite is also true, if the learner receives negative feedback they are less likely to repeat the inappropriate behavior (Morgan, 2011). It is the behaviorist philosophy that helped institute learning strategies such as; goals and objectives, teacher evaluations, and outcome-based education (Cook, 2017).

Jean Piaget was the founder of constructivism. Piaget studied children's moral and cognitive development. He speculated children learn and grow through a combination of their environment and their natural abilities. Piaget theorized it was not either nature or nurture, but it was a combination of them both that helped children

construct their intelligence. Lev Vygotsky had a similar view as Piaget but he had a more sociocultural perspective. Where Piaget focused on the child as an individual learner, Vygotsky theorized social interaction was more instrumental in helping children learn and grow (Krohg & Slentz, 2011). Vygotsky speculated children make meaning by the social interaction of child-to-child and adult-to-child experiences. These experiences help them develop and understand the values, culture, and skills of those around them. Vygotsky's zone of proximal development is described as the zone when learning takes place. This is when a child sees a task take place, desires to learn the task from their more mature peers, attempts the skill over time with help, and then eventually learns the skill. The child is ready to attempt the skill as demonstrated by their eagerness to learn the skill (Morgan, 2011). This social-constructivist approach calls for the children to take a mobile, active, and hands-on approach to learning. The children are active contributors to their lessons, and actively develop their understanding of learning and what it means to them (Cook, 2017).

Erik Erikson's stages of psychosocial development were influenced by Freud, Montessori, and Piaget (Krohg & Slentz, 2011). Erikson's work helps educators understand how children develop social and emotional health. Erikson theorized there were specific tasks individuals needed to accomplish at each developmental stage of life. Successful completion of each stage affects the next stage. As the individual completes the stages, they develop various personality strengths and weaknesses. The successful completion of a stage develops personality strengths. Personality weaknesses are developed when a stage is not completed successfully. Erikson theorized if a stage were not completed successfully the individual would continue to

have issues in life and work until they address the specific stage deficiencies. Erikson did suggest the deficiencies could still be addressed later in life. He speculated the early years of a child's development were crucial to developing trust, initiative, and autonomy. This is a window of time when the brain is fertile for a specific stage or type of learning. Erikson supposed preschool children need the teachers and caregivers to take their initiative seriously. He suggested preschool children need real tasks and tools to help build their competence. The children get a boost of confidence when they successfully complete a task. Erikson stressed the importance of development. He speculated once you understood the stages you as an educator or caregiver could help children move through them successfully (Mooney, 2013).

During a time when children as young as six were working in factories, the early childhood philosophers and theorists helped to bring attention to the educational needs of children. Early childhood education was used to help educate children in an attempt to help alleviate poverty and create a more educated workforce. Early childhood education was used to instill morals, a universal set of right and wrong. Early childhood education was used to combat religious and racial bigotry. Early childhood education was used to help create a more humane society (Morgan, 2011).

Executive Function

There is a window of opportunity, between 3 and 5 years of age, when there is a developmental advancement in executive function (Blair, 2016; Zelazo et al., 1996). Executive functioning is the inhibitory control, attention shifting, and working memory cognitive processes applied in goal directed activities, problem solving, and planning (Blair, 2016; Blair et al., 2007; Welsh et al., 2010). Nesbitt et al. (2015) stated a child's

executive functioning skills will begin in early childhood, advance considerably by the time the child goes to kindergarten, and then continue to grow throughout middle school and adolescence. Numerous studies show executive functioning as a strong predictor of educational achievement over measures of prior ability or intelligence (Blair, 2016; Blair et al., 2007; Fuhs et al., 2014; McClelland et al., 2007). Blair (2016) stated executive functioning is trainable and can be improved through executive function tasks. These executive function tasks can be practiced either directly or indirectly within various academic learning tasks. High quality prekindergarten programs provide organized activities that help the development of executive function. Some ways prekindergarten programs help foster executive functioning are through focused instruction in language development, structured play, and emotion regulation. Welsh et al. (2010) conducted a study to determine if the development of executive functioning skills coordinated with gains in academic readiness for low-income students. They found the growth of executive functioning during prekindergarten reinforced the prediction of reading and math achievement in kindergarten. Blair (2016) stated that children who come from high poverty homes are more at risk for having difficulty in school and poor school readiness. Therefore, Blair concluded that high quality early childhood programs that focus on executive functioning are more relevant for children coming from low-income families.

Closing Achievement Gaps

Reardon (2016) conducted multiple studies over the years to illustrate the school readiness gaps for children among various subgroups. In 2011 he found “the gap in achievement between kindergarten students from high and low-income families was roughly 1.25 standard deviations in 1998” (2016, p. 1). Reardon posited that

socioeconomic status has a large impact on education. Pearman ll and Stanford University (2020) found even the neighborhood, with the absence of prekindergarten, plays a large part in the learning opportunities for low-income families. He found that children from low-income families tend to live in high poverty neighborhoods. These neighborhoods tend to have high rates of violence, victimization, parent disengagement, and fewer opportunities for quality daycare and learning opportunities. These negative experiences likely cause children to experience heightened stress levels. Heightened stress levels hinder academic growth and the lack of quality childcare facilities hinders the children in these neighborhoods from combating this deficit.

In Readon and Portilla's 2016 study, their goal was to determine if the previously documented academic gap had narrowed any within the subgroups. They looked at the 1998 and 2010 kindergarten entry data. Their study was to determine school readiness; therefore, kindergarten entry data was the best starting point. They used three studies given by the National Center for Education Statistics. Two of the studies were *Early Childhood Longitudinal Study - Kindergarten Cohort (ECLS-K)* studies. These studied kindergarten students entering in the fall of 1998 and 2010. The Reardon and Portilla study revealed the gap declined in reading. These tests indicated that when given a standardized test, the academic gap between students from high and low income families began to significantly narrow over a 12 year span of time.

Reardon and Portilla (2016) speculated the most obvious explanation for this narrowing is the increase in prekindergarten programs and enrollment that target the low-income population. Another explanation could be the students from the high-income population could be remaining stagnant regarding academic growth. The narrowing gap

is noteworthy and Reardon and Portilla recommended additional research to determine the cause.

School readiness refers to a group of competencies needed for children to be successful in school (Cavadel & Frye, 2017). Williams and Lerner (2019) described school readiness in children as:

- Sensory motor development and Physical health, along with health growth and status;
- Social and emotional development, including attention, self-regulation, impulse control, ability to minimize disruptive and aggressive behavior, cooperation, turn-taking, empathy, and the capability to impart one's own emotions; recognition of feeling aids authentic and detailed articulation of these feelings;
- How the child approaches learning, including speaking, listening, vocabulary, print awareness, literacy skills, story sense, and drawing and writing and processes; and
- General awareness of cognition, including early math and literacy skills.

The building of these school readiness skills is essential for school success. Stormont et al. (2019) found the lack of school readiness can have adverse effects. Adverse effects include, but are not limited to, behavior difficulties, negative peer and teacher interactions, and academic struggles.

Project Head Start

Project Head Start was created in 1965 as a part of President Johnson's War on Poverty. The goal was to help children from low-income homes achieve a higher degree

of social competence (Grimmett & Garrett, 1989; Hinitz, 2014). In order to achieve this goal, the following standards and objectives were put in place:

1. The advancement of the children's physical abilities and health, including pertinent steps to mend current mental and physical problems and enlarge the children's access to an acceptable diet; the advancement of each family's future outlook in regard to physical abilities and healthcare.
2. The inspiration of spontaneity, self-confidence, self-discipline, and curiosity. These will help the improvement of the children's emotional and social health.
3. The improvement of the children's intellectual skills and processes, with special focus given to communication and conceptual skills.
4. The installation of expectations and patterns of accomplishment for the children. This will then instill an atmosphere for current and future academic tasks and long-term development.
5. An escalation of the children and family's capacity to relate to others and each other.
6. The improvement of the feelings of self-worth and dignity inside the family and the children. (Grimmett & Garrett, 1989).

From its inception, Head Start's role was twofold. Its design was to improve school readiness by building up the cognitive and social development of the children. Head Start provides extensive nutritional, health, and educational services for all the families and children. These services also consist of initial identification of mental or physical health issues, psychological issues, and dental help. Head Start specifically emphasizes assisting preschoolers' enhancement of reading, language, mathematics, and science.

These specific cognitive skills are essential for their prosperity in school. A goal that is woven throughout the program is the strengthening of social competence skills, or social emotional skills. The Head Start program works to enlist parents in assisting with their children's learning, as well as move the parents forward in their own literacy, educational, and employment goals (Bernstein et al., 2019).

In 1998, the Head Start program was required to be reauthorized in order to continue federal funding. Congress mandated a national study be conducted by the US Department of Health and Human Services to determine the impact of the program on the various children it serves. The study addressed the impact of Head Start on school readiness and parental practices as well as the circumstances that had the potential for the greatest impact. Puma et al.'s (2010) Head Start Impact study looked at children and their families from preschool through first grade. The Impact study had a national sample of 84 grantee or delegate agencies. The sample included almost 5,000 newly enrolled 3 and 4 year old students. The entering students were randomly assigned to either a Head Start program or a control group. The control group did not have access to the Head Start services, but they were permitted to enroll in other preschool programs. The data were collected from the fall of 2002 until the spring of 2006, ending with first grade (Puma et al., 2010). In 2012 a follow up study was published extending the data collection to the spring of 2008, ending with third grade (Puma et al., 2012). The study was set up to individually investigate two different cohorts of students. The study examined the length of time the students were enrolled in the program and if the amount of time impacts their overall learning. Therefore, the study separated the newly enrolled 3 year olds from the newly enrolled 4 year olds. The ethnic and racial

demographics of the two cohorts were significantly different. The 3 year old cohort had an approximately even distribution with 37.4 percent Hispanic students, 29.8 percent White or other students, and 32.8 percent Black students. The 4 year old cohort consisted of 51.6 percent Hispanic students, over half of the group, 30.8 percent White or other, and only 17.5 percent Black students.

The Head Start Impact study design was unique in that it implemented a randomized control design. The students were randomly assigned to a Head Start program or a control group. The Impact study design included a sample that was nationally representative of the children and the program. This allowed the study's results to be generalizable to the majority of the nationwide Head Start programs. The study examined Head Start's overall impact in four program domains. The domains being evaluated were social-emotional development, cognitive development, parent practices, and health services and status. The impact was measured by investigating the contrast of outcomes between the Head Start group and the control group (Puma et al., 2012; Puma et al., 2010).

The Head Start Impact study found that, for the preschool children who participated in the Head Start program, the program had a significant positive impact regarding every measure being investigated, as compared to the children in the control group. In school readiness, the 4-year-old group showed a significant positive impact in language and literacy in the cognitive domain. They also showed a positive impact in the health domain regarding dental care. In the 3-year-old group, they showed significant positive impacts in all four domains. Unfortunately, the data changes at the end of first grade. Regarding the cognitive domain, the groups showed positive impacts

in only one area. The 3-year-old group showed a positive impact in oral comprehension and the 4-year-old group showed a positive impact in vocabulary (Puma et al., 2010). By third grade, the 4-year-old group showed a positive impact for reading and the 3-year-old group showed a negative impact for grade promotion (Puma et al., 2012). In the social emotional domain, the 3-year-old group was the only one showing a positive impact. They showed positive and closer parent child relationships than the control group. The control group for the 4-year-old group had more positive teacher student interactions than the children who attended the Head Start program. By third grade, the 3- and 4-year-old groups' parents reported higher social emotional impacts than documented by teachers than the control group. The 4-year-old group documented fewer positive relationships with peers at school than students in the control group. In the health domain, the 4-year-olds impact was in health insurance coverage and lasted in both kindergarten and first grade. The 3-year-olds health insurance coverage impact lasted only through kindergarten. By third grade there were no significant impacts in health insurance coverage for either the 3- or 4-year-old groups. Regarding parenting, the 3-year-olds saw the positive impact. They showed favorable use of time-out and authoritarian parenting through kindergarten, first grade, and third grade. The 4-year-olds did not see significant impacts in the parenting domain in the kindergarten and first grade but in third grade they showed an increase in time spent with the child (Puma et al., 2010, 2012).

The Head Start Impact study also examined the various subgroups. The subgroups in the 4-year-old group that showed positive impacts in the social emotional domain were the students who displayed lower cognitive skills, students whose parents

documented mild depression symptoms, black students, and dual language learners. Black children maintained the positive social emotional impact into third grade. A positive cognitive impact remained through third grade for the students whose parents documented mild depression symptoms. The 3-year-old subgroups that illustrated positive impacts were students whose parents documented no sign of depression, children in non-urban environments, students with documented special needs, students with low cognitive skills, students from higher risk environments, and dual language learners. The students from higher risk environments maintained positive cognitive impacts through third grade. Unfortunately, there were subgroups that demonstrated unfavorable impacts. Students in the 3-year-old groups whose parents documented moderate depressive symptoms showed negative impacts in the cognitive domain, the health domain, and the social emotional domain. The unfavorable social emotional impacts carried over into the third grade. The 4-year-old students showed unfavorable impacts, through third grade, for the white subgroup in the social emotional domain. Overall, the Head Start Impact study showed early positive impacts, but these impacts were not sustained throughout the elementary school years (Puma et al., 2010, 2012).

Prekindergarten Sustainability

Abecedarian Project

The Abecedarian Project was a two-staged randomized controlled trial that looked at early childhood education and its effects on a child's first 8 years of life. The main research question was "To what extent can providing high quality early education to children from extremely impoverished and undereducated homes prevent intellectual disabilities, promote cognitive and positive social outcomes, and improve lifelong health

and well-being?" (Ramey, 2016, p. 2). Researchers screened pregnant women from various social services agencies, prenatal clinics, and hospital nurseries. The screener looked at 13 high risk indicators. If the family scored 11 or higher the family was invited to participate in the study. Of the families who were invited, 111 chose to participate in the study. "Of the 111 enrolled families, 98% were African American and 2% were non-Hispanic White. The majority (76%) were female-headed households, and 66% of the mothers had education levels below high school graduation. The mean IQ of mothers was approximately 80, 20 points below the average score of 100" (p. 4). After the babies were born, they were randomly assigned to either the treatment group or the control group. Fifty-seven students were assigned to the treatment group and 54 students were assigned to the control group. Upon entering kindergarten, the students were randomly assigned again to a treatment and control group. The treatment group received school-age intervention until the end of second grade. Overall, 25 students received intervention from birth to age eight, 24 students received intervention from birth to age five, 24 students received intervention from age five to eight, and 23 students received no intervention at all. The Abecedarian school-age program was created to enhance the children's home and school academic environments. This was based mainly on the idea that having access to quality school resources and having active parent support and involvement in children's academic work are essential to the children's success at school (Ramey, 2016). The treatment or intervention consisted of out-of-home childcare from infancy, a home schoolteacher met with classroom teachers biweekly to share information and discuss individual plans for parents, the homeschool teacher would meet with the caregivers and implement the activities discussed with the

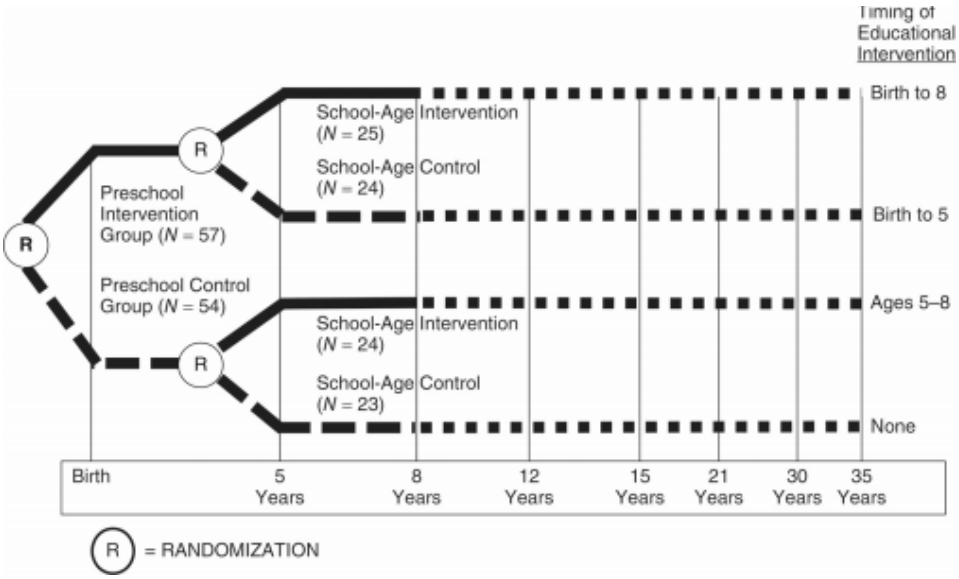
classroom teacher, and participation in the summer camp that involved enrichment activities (Campbell et al., 2002; Ramey, 2016).

All four groups were followed after age eight to access the sustainability of the program. They were assessed at the ages of 8, 12, 15, 21, 30, and 35. The results from birth to age 5 showed significant gains in language, intellectual development, and cognition for the treatment group as opposed to the control group. The effect size was 1.05. IQ scores were also assessed at 6, 18, 36, and 48 months. 95% of the treatment group-maintained IQ scores within normal limits. Forty-five percent of the control group-maintained IQ scores within normal limits (Campbell et al., 2002; Ramey, 2016).

After the groups entered kindergarten, they were randomly assigned again. The groups consisted of birth to second grade, preschool only, kindergarten to second, and the control group. Reading and math scores were assessed for each group. Figure 1 illustrates how the groups were separated. The reading effect sizes at age eight ranged from .28 to 1.04 indicating a medium to large effect size. The students in the treatment group tended to have higher reading scores, which would indicate the students who received some intervention tended to perform better in reading. The math findings were similar, but the effect sizes were more modest, they ranged from .11 to .64. The effect size diminishes based on the amount of intervention the students received. The reading and math larger effect size was for the birth to second grade group, then the preschool only group, and lastly the kindergarten through second grade group. Indicating the more intervention the student received the higher the effect size. The students who received more intervention tended to perform significantly better in reading and math than students who received some or no intervention (Campbell et al., 2002; Ramey, 2016).

Figure 1

Randomization Grouping for the Abecedarian Project (Ramey, 2016)



All the children were given Woodcock-Johnson reading and math assessments at ages 12, 15, and 21 years old. In the reading assessment, the students who were in the birth to age 8 treatment showed higher scores, followed by the birth to age 5 group, then the kindergarten through second grade group and the control group scored the lowest. The math assessment showed similar results as the reading assessment. The only difference being the birth to 8 and birth to 5-year-old programs were almost equal for ages 12 and 15. Overall the preschool program documented a greater difference than the school age intervention. By age 30 the students who attended the Abecedarian preschool program were four times more likely to attend and graduate from a 4-year college than the control group. The results of this high-quality program are an illustration of the success children can achieve no matter how they start life (Campbell et al., 2002; Ramey, 2016;).

Perry Preschool Program

The Perry Preschool Program was established in 1962 and continued until 1967. This program began under the premise that human intelligence can be improved if done in the early years. The study looked at 127 African American children born between 1958 and 1962. The children selected for the study resided in the Perry Elementary school district in Ypsilanti, Michigan. The preschool age children were identified from referrals, school census, and door-to-door canvassing. After the children were identified their socioeconomic levels were assessed. These levels were based on the head of household employment level, parents' education, and the ratio of rooms to persons in the household. Children who scored below a specific socioeconomic level were then given an intelligence test. The children who scored between 60 and 90 on the Stanford Binet intelligence test and did not show any signs of organic handicap were placed in the study. The children were then randomly divided into two groups, a preschool group, and a non-preschool group. Each preschool group attended school as 3-year-olds and 4-year-olds, except the first group. Each preschool group attended school for 7.5 months for 2.5 hours every weekday. The teacher-child ratio for each group was one to every five or six, respectively. The teachers visited the homes of the children for 1.5 hours each week. Each teacher had extensive training and continuous coaching by the supervisor (Preschool in the U.S.: The High/Scope Perry Study, 2005; Schweinhart, 2016; Schweinhart et al., 1985).

The Perry Preschool Program study compared the academic, social responsibility, and socioeconomic success of the students who attended the preschool program and those who did not attend the preschool program. The data were collected

from both groups at ages 3 to 11 and again at 14, 15, 19, 17, 27, and 40. The program group outperformed the non-program group on various intellectual and language tests, school achievement tests, and literacy tests. The program group stayed in school longer and was less likely to be classified as mentally impaired. The program showed an even larger difference in the female group. They were 42% more likely to graduate from high school or get a GED than the females in the non-program group. In social responsibility, the program group was arrested less often, and the females reported fewer pregnancies as teenagers. In socioeconomic success twice as many from the program group were employed and half as many from the program group were receiving welfare as the non-program group. When reporting at ages 27 and 40, more of the program group were employed and owned their cars and homes than the non-program group. By age 40 the program group had significantly higher wages than the non-program group (Preschool in the U.S.: The High/Scope Perry Study, 2005; Schweinhart, 2016; Schweinhart et al., 1985).

The success of the Perry Preschool program has been attributed to the quality of the design. The program required the teachers to have bachelor's degrees in either early childhood, elementary or special education with a certification in early childhood. They were coached, supported, and supervised constantly by well-trained professionals. The teachers used a High Scope curriculum model and were responsible for five to six children each. The program fully engaged the parents due to the teachers visiting their homes weekly and working with them to help their children become successful. Lastly, the program's implementation and the children's development were

regularly assessed and adjusted to maximize effectiveness (Preschool in the U.S.: The High/Scope Perry Study, 2005; Schweinhart, 2016; Schweinhart et al., 1985).

Chicago Child Parent Centers (CPC)

The Chicago child parent centers (CPC) were established in 1966 by the Chicago Public School District. Chicago Public schools were the first to use Title 1 funds for preschool education. It was the first comprehensive prekindergarten to third grade program funded by federal funds. It was the second oldest program, after Head Start, to be funded federally. The CPC program emphasized five features: parent involvement, literacy and language instructional approach, beginning the program no later than 4 years old, social and health services, and cohesiveness from preschool to the early grades. The services of this program were teacher in-service on child development, instructional supplies, coordinating adult supervision, attending to the children's health and nutritional needs, reduced class sizes, reading and writing learning centers, feedback, and reinforcement. Each center enrolled children from preschool to third grade, allowing up to 6 years of intervention. Each center analyzed the children's needs and tailored the instruction to meet their needs. They used one-on-one instruction, whole group literacy instruction, small group instruction, and field trips. The teacher-child ratio was one teacher to eight and a half students in preschool and one teacher to 12 students in grades kindergarten to third. Parent involvement was a requirement for the program. The program at each center was facilitated by a head teacher, a school and community representative, and a parent resource teacher. The parent resource teacher coordinated the parent involvement activities. The parents were required to spend half a day a week in a parent involvement activity. These activities would include

but were not limited to working in the classroom, attending parent teacher conferences, educational workshops, and attending school events. The school community representative coordinated community outreach activities and home visits with the families (Conyers et al., 2003; Reynolds & Mondi, 2016; Temple et al., 2000).

The Chicago Longitudinal Study (CLS) looked at 1,539 minority students who attended the CPC in 1985. Twenty full day CPC kindergarten classrooms were compared to six non-CPC kindergarten classrooms. The non-CPC kindergarten sample were students who lived in a comparably poor neighborhood and would have qualified for the CPC program, but it was not offered in their area. The CPC kindergarten sample included 989 children. These children completed both preschool and kindergarten in the CPC program between 1983-1986. The non-CPC sample included 550 children who did not participate in the preschool program but did participate in a full day kindergarten program in the Chicago public schools (Reynolds & Mondi, 2016; Temple et al., 2000; Conyers et al., 2003).

The CPC group entered kindergarten significantly higher in school readiness skills than the non-CPC group. The CPC group scored significantly higher math and reading scores by the end of third grade than the non-CPC group. The CPC group continued to show higher academic scores than the non-CPC group up to age 15. The CPC group had higher parent participation in schools from preschool to third grade. The CPC group had fewer children receiving special education or retained in grade than the non-CPC group. The CPC group had 14.4% receiving special education services as opposed to 24.6% of the non-CPC group. The chances of being retained a grade reduced by 30 to 40% for the CPC group. By age 24 to 26, the CPC group had

significantly lower adult felony arrests, juvenile arrests, and adult convictions than the non-CPC group. By age 21 the CPC group had a higher rate of completing high school and by 26 had completed more years of education than the non-CPC group. By age 28 the CPC group had higher levels of socioeconomic status and job skills than the non-CPC group. This program has been used in many studies as a testament to the effectiveness and sustainability of high-quality early childhood programs (Reynolds & Mondi, 2016).

North Carolina's Early Childhood Programs

North Carolina was one of the first states to take these success stories and upscale the intervention statewide. They implemented two early childhood programs beginning in 1993 that have changed the trajectory of students who come from impoverished circumstances. The first program is called Smart Start (SS) which is a program that began in 18 North Carolina counties; and by 1998, the program covered all 100 counties. The program serves children from birth to age four. The goal of the program is to strengthen families, raise the quality of childcare, improve early literacy, and advance child and health development. Since the inception of the program, the quality of childcare had increased. In 2001 the average star rating, on a five-point quality scale, for sponsored childcare facilities was 2.68; by 2019 those same facilities scored an average of 4.52 stars (Bai et al., 2020; Dodge et al., 2017).

In 2001 North Carolina added to the SS program the More at Four (MAF) programs. This state funded prekindergarten program targeted high-risk 4-year-olds. High-risk was defined by family income, disability, developmental need, chronic illness, or English language proficiency. Once identified the children were placed in a high-

quality prekindergarten program. Each classroom had state-mandated guidelines for class size, staff credentials, childcare licensing, and teacher child ratios. The prekindergarten programs consistently receive a 10 for quality, the highest possible rating (Dodge et al., 2017).

Dodge et al (2017) studied the two North Carolina programs to determine if the initial impact of the program began to fade as the students got older and if there were particular subgroups that were significantly impacted more than others. The participants included all the children born “between January 1, 1988 and December 31, 2000, who attended public school in NC at least some time between July 1, 1995 and June 30, 2012, whether or not the child actually attended a state funded program” (Dodge et al., 2017, pp. 1000-1001). These children were then coded by birth weight, race, age of the mother, education level, and marital status of the parents. There were 13 cohorts identified who were born from 1988-2000. Of these 13, eight of them only experienced SS (1988-1995), five of them experienced SS and MAF (1996-2000). They looked at third, fourth, and fifth grade math and reading achievement scores on the state standardized assessments. They looked at the year-end data from the “Accountability and Exceptional Children divisions of the NC Department of Public Instruction” (Dodge et al., 2017, p. 1002) to determine if any of the children were placed into the special education program. They also looked at grade retention. A child was coded as retained if he or she repeated the same grade and coded if he or she ever repeated a grade (Dodge et al., 2017).

Dodge et al (2017) found that students who were exposed to SS and MAF had significantly higher test scores in reading and math for third, fourth, and fifth grades.

They found the probability of students being placed in a special education program decreased if the child was just influenced by SS by 10% in third grade, 8% in fourth grade, and 7% in fifth grade. If the child also attended a MAF prekindergarten program it decreased by 29% in third grade, 43% in fourth grade, and 48% in fifth grade. SS reduced the possibility of grade retention in third grade by 11%, but there was not a significant reduction in the other grades. MAF did not show a significant impact in repeating a grade at any grade level. Regarding the subgroups, they found the students who qualified for free or reduced lunch and participated in the SS and MAF programs showed a stronger effect than those who did not qualify for free or reduced lunch. “As the funding allocations increased, the difference or ‘gap’ between FRL qualifying and FRL non qualifying children decreased” (Dodge et al., 2017, p. 1009).

Bai et al. (2020) took the same group of students used in Dodge et al. (2017) and continued to track their progress for sixth, seventh and eighth grades. They inspected the data to determine if the impact remained the same, grew, or faded out. They also separated the participants into subgroups and looked at the impact of the program regarding race, income, and mothers’ education level. They found no fade out effects, in fact, they found if a student participated in the MAF program they grew academically. Students who qualified for free or reduced-price lunch gained more in reading and math from attending the MAF program than students who did not qualify for free or reduced-price lunch. Students who attended the MAF program who had black mothers also showed significant gains in reading and math scores (Bai et al., 2020).

These studies illustrated that a state-run early childhood program can show growth and not fade out. It can help reduce the academic gap between subgroups.

Dodge et al. (2017) stated the success of the programs is due to the design of the programs. North Carolina designed them to saturate the communities. The intent was to have so many students attending school together that the teachers could then move on with the material and not have substantial amounts of remediation needed for students who did not attend. All the students would start school basically on the same level. Bai et al. (2020) stated the success of the program was due to the high-quality standards North Carolina implemented throughout its school system. Most likely it was a combination of both strategies that were producing growth in the North Carolina schools (Bai et al., 2020; Dodge et al., 2017).

Putnam County, Tennessee

Winningham (2017) compared the scores of students who attended the prekindergarten program and students who qualified but due to numbers were unable to attend. He examined grade point averages (GPA), MAP Universal Screener, and ACT Explore scores. In addition to the GPA, MAP and ACT scores, he examined discipline referrals and number of days absent. Winningham analyzed specific students' scores in grades three, seven, and nine. He found the GPA of students who attended prekindergarten were significantly higher than the students who did not attend on all three grade levels. The third grade and seventh grade MAP Math and Reading scores showed a significant difference between the students who attended prekindergarten and those who did not. The prekindergarten group scored significantly higher than those who did not attend prekindergarten. The ninth grade ACT Explore assessment had similar outcomes. The students who attended prekindergarten scored significantly higher than those who did not attend prekindergarten. There was not a significant

difference across the grade levels in attendance or discipline referrals except for third and ninth grade. The prekindergarten students in third grade missed significantly fewer days and the students in ninth grade had significantly fewer discipline referrals than the students who did not attend prekindergarten.

National Research on Prekindergarten programs

The National Institute for Early Education Research (NIEER) was founded in 2002. NIEER supports quality and fairness in early childhood education by managing and publicizing unbiased policy analysis and research. The institute provides an annual report, or preschool yearbook, that surveys and tracks each state's prekindergarten policies. It tracks operating schedules, eligibility and enrollment, personnel, program standards, funding, and monitoring and evaluation. The institute also conducts field studies that evaluate program effectiveness, professional development, teacher practices, early learning scale for children, and policy analysis. The institute advocates for public and private spending on young children. They lobby policy makers and inform them of the research behind the cost, benefits, and educational policies of early childhood programs. The yearbook is also a resource for the media and academia. It helps bring transparency to state preschool programs policy and its consequences. NIEER has researched who has participated and who has not participated in the prekindergarten programs. The investigation of participation looked at state and national patterns. It reported that prekindergarten enrollment rates were unequal in the percentage of students who would benefit from the program. In other words, the students who need the program the most were not enrolling in the programs (Barnett, 2016).

In recent years, the NIEER has continued to report a national decline in prekindergarten spending, which correlated to a national decline in prekindergarten programs. They document the pivotal year of the Great Recession beginning in 2008. After 2013 the enrollment rate has begun to increase but at an exponentially slow rate. At this rate, it will take 20 years to reach just half of the 4-year-olds. Currently, about 40% of children coming from a home with an annual income below $10,000 will not attend a prekindergarten program. The percentage is even higher for children who fall within the low to moderate income level. Friedman-Krauss et al. (2019) noted that the states are going to have to work harder to reach these families and enroll their children in the prekindergarten programs. Enrollment is not the only issue the states have. Friedman-Krauss et al. (2020) noted that many states do not meet a high level of quality that makes the programs impactful on development and learning. The institute documents a decline in quality as the programs and enrollment began to decline.

The NIEER institute recommends some policies that could help with the declining enrollment, funding, and quality currently being experienced in the state-funded prekindergarten programs. They call for the federal government to allocate funding to help expand and stabilize the programs. Another policy change they recommend is in the Head Start program. As the Head Start program began to enroll students from infancy to toddlers, the 3- and 4-year-old program began to diminish. Unfortunately, the states have not enrolled them in a prekindergarten program as quickly as the Head Start program has dropped them. Therefore, NIEER called for the Head Start program to continue to serve the same amount of 3- and 4-year-old students in addition to the infant and toddler programs. Lastly, they highly recommend states set a timeline that

incorporates long-term plans for realistic funding that will help make all their prekindergarten programs high-quality. The program should include high standards for teaching and learning as well as continuous support to help maintain these standards (Friedman-Krauss et al., 2020).

Tennessee Voluntary Prekindergarten

In May of 2005, the Voluntary PreK (VPK) for Tennessee Act of 2005 legislation passed to fund prekindergarten classrooms across the state. That year the state provided $25 million to various districts to begin implementing this initiative. Approximately over $85,000,000 was allocated from the state education budget to various school districts in order to operate 935 classrooms. Across the state these classrooms are currently serving 18,000 4-year-olds. The programs are full-day programs serving 4-year-olds who will enter kindergarten the following year. The program requires a teacher licensed in early childhood education who will teach an approved curriculum with an adult-child ratio of 1:10, with a class size of 20 being the maximum. The programs are targeted to the neediest children. Children who qualify as low-income are the first to enter the VPK program. Once the list of low-income students have been exhausted, then students with other at-risk factors are considered for entry. In 2016 the state legislature signed The Pre-K Quality Act, S.B. 1899 (H.B. 1485). This act called for the grant to become competitive, require student growth portfolios for prekindergarten as well as kindergarten, a curriculum alignment from prekindergarten to twelfth grade, and that prekindergarten programs would comply with the state's definition of quality (Tennessee Department of Education, n.d.a).

In 2009, the Vanderbilt University's Peabody Research Institute conducted a randomized control trial to determine the effects of the Tennessee voluntary prekindergarten program. "It was designed to determine whether the children who participate in the TN-VPK program make greater academic and behavioral gains in areas that prepare them for later schooling than comparable children who do not participate in the program" (Lipsey et al., 2015, p. 1). The researchers chose locations where the number of applicants exceeded the spots available. The children were randomly placed within the programs. The students were assessed using the same measurement instrument at various intervals. The students were randomly assigned for the 2009-2010 and 2010-2011 academic years. Over 3000 students were randomly assigned within a group, either the test group or the control group. Parent permission was received from 1076 students, these students were assigned to the substudy. The 1076 students were given the various assessments. The students in the VPK program were given the assessment during school. The students who were a part of the control group were given the assessment in various locations within the cities they resided.

The instrument used to assess academic gains was the Woodcock Johnson lll Achievement Battery. Students were given the assessment at the start and end of the prekindergarten year as well as the spring of the kindergarten through third grade years. The test assessed math skills, early literacy, and language. The scores of the subtests were summarized and averaged together to get an overall composite score. Two teacher rating forms were used to measure the non-cognitive outcomes. The Cooper-Farran Behavioral Rating Scales looked at work related skills and social behavior. The

Academic Classroom and Behavior Record looked at readiness for grade level work, liking for school, behavior problems, and peer relations (Lipsey et al., 2015).

The pre and post prekindergarten assessment showed the students who attended prekindergarten had significantly higher scores in all academic areas with a larger increase in literacy than the control group. At the beginning of kindergarten, the teachers rated the VPK students as having better peer interactions and better behaviors as compared to the control group. “By the end of kindergarten, the control children had caught up to the TN VPK children and there were no longer significant differences between them on any achievement measures” (Lipsey et al., 2015, pp. 4-5). The first-grade composite scores revealed the same lack of significant differences. By second grade, however, the TN VPK students began to score lower on the academic subtests. This downward trend continued into third grade as well. Regarding the behavioral scores, the first-grade teachers rated the TN-VPK students as less prepared for school, having a negative feeling toward school, and poor work habits, than the control group. The second and third grade rating scores were almost the same for the TN-VPK and control group with a slightly higher effect size for positive peer interactions for the TN-VPK group (Lipsey et al., 2015).

The vast majority of prekindergarten studies establish the effectiveness of prekindergarten on school readiness. Even the Vanderbilt Study illustrated the effectiveness of prekindergarten on school readiness. The number of studies illustrating prekindergarten’s effect after kindergarten is limited. Pearman ll et al. (2020) used the data from the Vanderbilt Study to assess the sustaining environment of Tennessee schools. After the Vanderbilt Study was conducted and published there were many

questions. For example, with so many studies illustrating the academic gains prekindergarten students show at the end of prekindergarten, why were they showing a decrease from kindergarten to third grade? The Pearman ll et al. sustaining environment study addressed the question of prekindergarten academic sustainability. “The sustaining environments perspective holds that for early childhood interventions to be deemed successful subsequent learning environments must, at the very least, maintain the learning advantages brought about by attending preschool” (p. 4). In other words, prekindergarten students need to attend a school that will continue to move them forward academically instead of allowing them to remain stagnant. If the learning environment is of lower quality, then the teachers are spending more time trying to catch up the ones who did not attend prekindergarten than moving those who did forward. The researchers accessed the Vanderbilt prekindergarten study’s participants and correlated them with the schools they attended. The researchers looked at the teacher evaluation scores of the participants, the value-added scores of the schools and the Tennessee Comprehensive Assessment Program (TCAP) scores of the participants. The study revealed no significant difference in the TCAP scores of the prekindergarten and non-prekindergarten participants when they attended a school with highly effective teachers or a high-quality school. The study revealed a significant difference in the TCAP scores of prekindergarten and non-prekindergarten participants when the students attended a high-quality school and had highly effective teachers. The researchers then wondered whether the years a student is instructed by a highly effective teacher has a significant relationship to TCAP scores. They found when the prekindergarten students attended a high-quality school and had effective teachers for

their kindergarten and first grade years their ELA TCAP scores were significantly higher. The reverse was true for Math TCAP scores. They found when the prekindergarten students attended a high-quality school and had effective teachers for their second and third grade years their Math TCAP scores were significantly higher. This study revealed the sustainability of the prekindergarten academic gains when they attend schools with high quality instruction and environments. Unfortunately, only 12% of the sample were able to experience this learning environment. 40% of the participants attended a school that was low quality and had access to zero highly effective teachers. This study gives insight into a possible reason why the results of the Vanderbilt Study illustrated a decrease in academic achievement.

The definition of a high-quality prekindergarten program differs depending on whom you ask. “It is decidedly not the case that just any pre-k program operating under just any circumstances will provide young children with the inputs they need to produce, let alone sustain, early developmental gains” (*The Current State of Scientific Knowledge on Pre-Kindergarten Effects*, 2017, p. 23). Features of a quality early childhood program will include a program’s basic elements; aspects of the classroom climate; the depth of teacher-student communication that children experience; and aggregate indicators, such as enhancement systems and quality ratings, that incorporate measurements across a variety of program components. *The Current State of Scientific Knowledge on Pre-Kindergarten Effects* (2017) suggest some basic structural elements would include professional development, coaching, curriculum, length of the school day, and teacher student ratios. An effective curriculum will encompass engaging activities that focus on developmentally appropriate skills that help build a foundation for rich learning to follow.

The implementation of this curriculum should include professional development and coaching for the teachers. The assessment of a high-quality classroom environment would include learning and play materials, cleanliness, the arrangement of the classroom, and the daily schedule. Teacher and student interaction are critical to a high-quality learning environment. Teacher and student interactions include emotional support, the back-and-forth language dialogue, as well as the teacher's overall behavior and attitude. Anticipated routines permit young children to develop progressively independent as they pioneer their own learning. Children who have exposure to mainly positive, supportive communication with their teachers are more confident making mistakes, exploring, and thus persevering and searching for difficult tasks. Research shows when you combine teacher training, as well as a positive and organized environment with an evidenced-based curriculum then strong prekindergarten outcomes can be achieved for all young children (*The Current State of Scientific Knowledge on Pre-Kindergarten Effects*, 2017).

Kindergarten Rigor and Intervention

Kindergarten began in Germany in the early 1800s. Friedrich Froebel envisioned teachers being gardeners and the children were the plants they were nurturing. The foundation of his kindergarten was play-based learning and hands-on activities. Colgan (2016) stated Froebel's intent for kindergarten was for it to be respected and valued as important. It was not to merely be a tool to prepare children for school, but to train the whole child for lifelong learning. The play materials (balls of yarn, blocks, shapes) were used to promote spatial awareness and early language development. This philosophy

has changed over the years once kindergarten became integrated into the public school system in the 1900s.

Kindergarten has changed even more since the passing of the No Child Left Behind Act in 2002 and the Every Student Succeeds Act of 2015. Both laws pushed for instruction to be standardized in order for all students to receive a specific level of skills and knowledge at the various levels of school. With these laws also came high stakes accountability measures. Even though these standardized assessments did not begin until the third grade many of the reforms began to find their way down into the early elementary grades (Brown et al., 2020).

Bassok et al. (2016) analyzed data collected during a longitudinal study. Data for The Early Childhood Longitudinal study were collected in 1998 and 2011. Each of the sets of data included teacher, administrator, and parent surveys as well as student assessments. Bassok et al. found the amount of time teachers spent teaching academic skills and giving standardized tests increased significantly and the amount of time spent in child-led activities decreased significantly. They hypothesized that one reason, in addition to the pushed down accountability measures, could be the additional availability children have to public preschool has correlated to incoming kindergarteners today already having considerable exposure to learning opportunities and classroom environments that may not have been available two decades ago.

From the beginning, kindergarten was intended as a place to enhance student learning using play (Repko-Erwin, 2017). It was intended to give children a place to acquire the foundational skills needed in order to build and obtain new learning. Now kindergarten encompasses more formal and direct academic instruction similar to what

they would experience in first grade. Before the No Child Left Behind Legislation children left kindergarten ready to read, now children are expected to leave kindergarten already reading (Repko-Erwin, 2017). These are huge shifts in education, especially for a student's first experience in school.

This shift has a huge impact on the academic success of kindergarten children who come from low-income households (Repko-Erwin, 2017). Studies show they start school behind and in addition to beginning behind, the curriculum and standards are accelerating. This causes the academic gap to increase (*The Current State of Scientific Knowledge on Pre-Kindergarten Effects*, 2017). Many states and districts have put prekindergarten programs in place to help minimize the gap but there are still students who do not have the opportunity to participate in these programs (Friedman-Krauss et al., 2019). If the school system does not have programs in place to combat this gap, then the kindergarten teachers are spending instructional time catching up students who did not attend prek. Unfortunately, this strategy leaves the prek students stagnant and later behind (Pearman ll et al., 2020). A program many states and school districts have implemented to combat this issue is Response to Intervention or RTI.

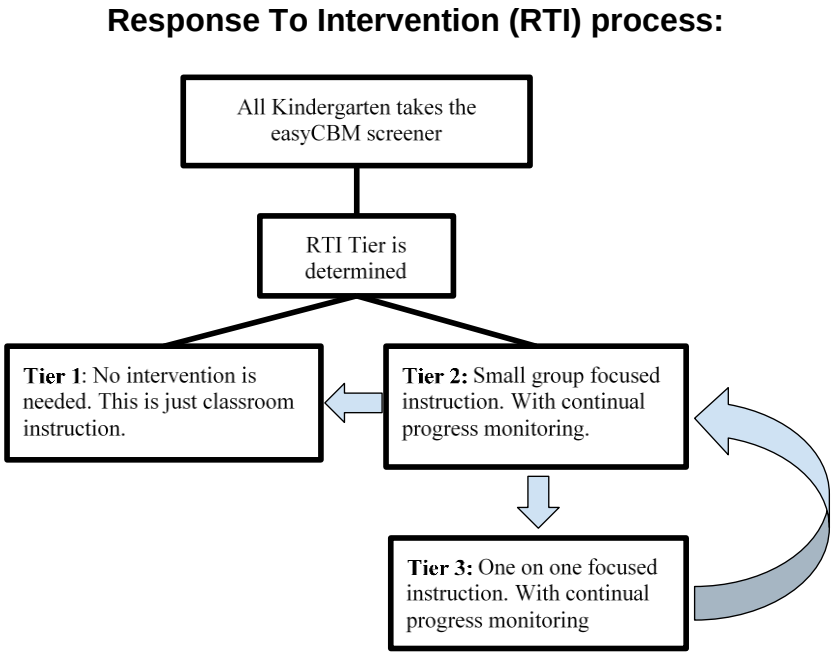
Response to Intervention (RTI)

"Response to Intervention (RTI) is a model for the early identification and prevention of reading disabilities" (Catts et al., 2015, p. 281). If this model is implemented correctly children can be identified early if they have a learning or reading disability. This model uses focused interventions and instruction based on scientific research. The model is comprised of three tiers. Tier l represents the classroom instruction. For Tier 1 there is no intervention needed. Tier ll consists of supplemental

instruction. Tier ll is the first level of intervention. This tier will consist of small group instruction targeting a specific skill. Tier lll consists of intensive intervention. In many instances, Tier lll intervention consists of one-on-one instruction. Ideally, this model will begin in kindergarten or first grade at the latest. The model begins with all the kindergarten or first grade students participating in a universal screener. The screener identifies children who are at risk for reading or learning disabilities. Children who do not perform well on the screener are placed on the Tier two level of intervention. If the children on Tier two continue to show poor response to the intervention, then the student is placed on Tier three. If students continue to show slow response or no response the students are then referred for special education placement (Catts et al., 2015). Figure 2 is a chart that illustrates the RTI process.

Figure 2

Response to Intervention (RTI) Process (Catts et al., 2015).



Chapter 3. Methodology

The purpose of this quantitative study was to investigate if there is a relationship between Tennessee's Voluntary Prekindergarten (VPK) program and kindergarten achievement in Title 1 schools in one school district in northeast Tennessee. I compared the academic growth of students who attended a VPK program to students who did not attend a VPK program. The research design is a causal-comparative quasi-experimental study. The variables and data were in place and collected prior to the start of the study. Pertinent data were the easyCBM scores of students who came from low socioeconomic backgrounds. Kindergarten teachers give the first easyCBM assessment in the second semester of school. I compared the easyCBM scores of the students who attended a VPK program to the ones who did not attend a VPK program. This could reveal if there is a difference between students who attended the VPK program and those who did not in the academic growth and the amount of intervention a student will need the second semester of kindergarten.

Research Questions and Null Hypotheses

1. Is there a significant difference in the December easyCBM screener scores in letter sounds (LS) between Kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

$H_0$1: There is no significant difference in the December easyCBM screener scores in letter sounds (LS) between Kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program.

2. Is there a significant difference in the December easyCBM screener scores in phoneme-segmenting (PS) between Kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

$H_0$2: There is no significant difference in the December easyCBM screener scores in phoneme-segmenting (PS) between Kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program.

3. Is there a significant difference in the December easyCBM screener scores in word reading frequency (WRF) between Kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

$H_0$3: There is no significant difference in the December easyCBM screener scores in word reading frequency (WRF) between Kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program.

4. Is there a significant difference in the December easyCBM screener scores in the math common core state standard (CCSS) between Kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

$H_0$4: There is no significant difference in the December easyCBM screener scores in the math common core state standard (CCSS) between Kindergarten students who

attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program.

5. Is there a significant difference in the May easyCBM screener scores in letter sounds (LS) between Kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

$H_0$5: There is no significant difference in the May easyCBM screener scores in letter sounds (LS) between Kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program.

6. Is there a significant difference in the May easyCBM screener scores in phoneme-segmenting (PS) between Kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

$H_0$6: There is no significant difference in the May easyCBM screener scores in phoneme-segmenting (PS) between Kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program.

7. Is there a significant difference in the May easyCBM screener scores in word reading frequency (WRF) between Kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

$H_0$7: There is no significant difference in the May easyCBM screener scores in word reading frequency (WRF) between Kindergarten students who attended the Volunteer

Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program.

8. Is there a significant difference in the easyCBM screener scores in letter sounds (LS) of VPK students taking the test in December and the scores of the same students taking the test again in May?

$H_0$8: There is no significant difference in the easyCBM screener scores in letter sounds (LS) of VPK students taking the test in December and the scores of the same students taking the test again in May.

9. In Title I schools, is there a significant difference in easyCBM gain scores from December to May in letter sounds (LS) of kindergarten students who attended the Volunteer Pre-K program and kindergarten students who did not attend the program?

$H_0$9: In Title I schools, there is no significant difference in easyCBM gain scores from December to May in letter sounds (LS) of kindergarten students who attended the Volunteer Pre-K program and kindergarten students who did not attend the program.

10. Is there a significant difference in the easyCBM screener scores in Phoneme Segmenting (PS) of VPK students taking the test in December and the scores of the same students taking the test again in May?

$H_0$10: There is no significant difference in the easyCBM screener scores in Phoneme Segmenting (PS) of VPK students taking the test in December and the scores of the same students taking the test again in May?

11. In Title I schools, is there a significant difference in easyCBM gain scores from December to May in phoneme-segmenting (PS) of kindergarten students who attended the Volunteer Pre-K program and kindergarten students who did not attend the program?

$H_0$11: In Title I schools, there is no significant difference in easyCBM gain scores from December to May in phoneme-segmenting (PS) of kindergarten students who attended the Volunteer Pre-K program and kindergarten students who did not attend the program.

12. Is there a significant difference in the easyCBM screener scores in word reading frequency (WRF) of VPK students taking the test in December and the scores of the same students taking the test again in May?

$H_0$12: There is no significant difference in the easyCBM screener scores in word reading frequency (WRF) of VPK students taking the test in December and the scores of the same students taking the test again in May.

13. In Title I schools, is there a significant difference in easyCBM gain scores from December to May in word reading frequency (WRF) of kindergarten students who attended the Volunteer Pre-K program and kindergarten students who did not attend the program?

$H_0$13: In Title I schools, there is no significant difference in easyCBM gain scores from December to May in word reading frequency (WRF) of kindergarten students who attended the Volunteer Pre-K program and kindergarten students who did not attend the program.

Population

The upper-east Tennessee suburban school district used in this study serves approximately 8,000 students in grades prekindergarten through 12th grade. There are 12 schools within the school system; eight of them are elementary schools. Of the eight elementary schools, five house prekindergarten programs. The five elementary schools that house the prekindergarten programs are represented in this study. The school district also houses two early childhood learning centers. The early childhood learning centers are also represented within this study. 78.6 percent of the student population are White, 18.8 percent of the student population are within the Black/Hispanic/Native American subgroup, and two percent of the student population are Asian. 35.1 percent of the student population are economically disadvantaged, and one percent of the student population are English language learners (Kingsport City Schools, n.d.; Tennessee Department of Education, n.d.b).

In 2018-2019, six of the schools were named as reward schools for their outstanding achievement on the TNReady statewide achievement test. They received a level 5 out of 5 for growth in ELA, math, and social studies (Tennessee Department of Education, n.d.b). In 2020 two of their elementary schools were named as Leader in Me Lighthouse schools. This school system consistently produces scores in ACT and SAT above the national average. Their TCAP academic performance surpasses state and national averages in every grade level and discipline tested (Kingsport City Schools, n.d.).

Volunteer Prekindergarten participants are selected based on income eligibility defined by the Tennessee Department of Education (Tennessee Department of

Education, n.d.a). The children must be 4 years old on or before August 15 in order to be eligible for enrollment in the upcoming school year.

Instrumentation

The source of the data came from the easyCBM screener. I used the kindergarten winter and spring easyCBM screener scores. Curriculum-Based Measurement (CBM) is a technology-based screener used in the Response to Intervention (RTI) three-tiered approach to intervention. It is used "for the purpose of identifying who should be the target of continued monitoring and attention, for quantifying responsiveness to intervention among those targeted for monitoring, and for tailoring individualized instructional programs for the most unresponsive subset of children" (Fuchs & Fuchs, 2007, pp. 29-30). CBM's are different from classroom assessments because they are standardized which allows for measurement of behaviors and prescribing procedures of the measured behaviors, with documented validity and reliability. CBM's testing methods are long term with content consistency throughout the school year. CBM's are also based on fluency and the students are given a fixed amount of time to answer the questions. This helps show the students' ability to perform the tasks over time with ease (Fuchs & Fuchs, 2007). CBM's are user friendly, inexpensive, and recommended by the U.S. Department of Education to assess student progress (Alonzo & Tindal, 2011).

easyCBM was developed by the National Center on Progress Monitoring. From its initiation into the market in the fall of 2006, it has grown in popularity. The easyCBM system encompasses a universal screener and progress monitoring.

> Student performances on the easyCBM benchmark measures are used to identify students for additional intervention, and their scores on the easyCBM progress-monitoring measures are used, in part, to evaluate the effectiveness of provided interventions and to modify instruction as needed. For academically struggling students, lack of progress on curriculum-based measurement (CBM) measures, when the students have been provided with appropriate interventions, implemented with integrity for a sufficient period of time, has served as the primary factor for determining eligibility to receive special education services. (Tindal & Alonzo, 2016, p. 474)

The development of the easyCBM measures were based on the principles and guidelines of universal design for assessments and test development laid out in “The Standards for Educational and Psychological Testing with particular attention to accessibility and freedom from bias” (Tindal & Alonzo, 2016, p. 475). During the development of each item, grade level educators were commissioned to draft the various measures. Once the measures were developed, each measure was thoroughly reviewed by trained assessment researchers. After the measures were reviewed for bias, sensitivity and content it was piloted by grade-level students. Item response theory (IRT) was used on the piloted data to analyze the responses and create multiple different forms in order to establish the progress monitoring and screening measures. The various forms were created to increment up or down, in academic difficulty, based on the participant’s ability. If the participant is struggling with a particular area, the test will time them out, but if the participant is doing well, it will give them more difficult material. Following the creation of the assessment tool the easyCBM was tested for

“reliability (test-retest, alternate form), internal consistency (both within and between measure type), sensitivity and specificity, generalizability of measures, and to provide evidence of their validity in making screening and progress monitoring decisions” (Tindal & Alonzo, 2016, p. 475). The results of these studies have helped to establish the reliability and validity of the easyCBM assessment for use as a screening and progress monitoring tool (Alonzo & Tindal, 2011; Tindal & Alonzo, 2016).

Data Collection

I was given permission from the school system to access the data. I relied on the performance excellence administrator and early childhood director of the school system to pull the classroom rosters and screener data. EasyCBM data were pulled for every kindergarten student. The easyCBM software compiles the data into a spreadsheet. The performance excellence administrator for the school system pulled the easyCBM data and stored it onto a password protected database. The school system’s early childhood director pulled the rosters of the previous year’s prekindergarten programs. The rosters were used to separate the students based on attendance of a VPK program, Title 1 prekindergarten program, or no program. Once the students were separated the data was given to me without names or identifying markers. The data included the school attended, winter and spring easyCBM scores and student demographics. The data consisted of 3 consecutive years of data. Data were collected, sent and saved on a password-protected drive so that no data could be seized or released in the event of a mistake or theft.

Data Analysis

For Research Questions 1 through 4, I used a series of independent t-test to compare the December easyCBM screener scores of the students who attended the VPK program and those from Title 1 schools who did not attend a prekindergarten program. For Research Questions 5 through 7, I used a series of independent t-test to compare the May easyCBM assessment scores of the students who attended the VPK program and those from Title 1 schools who did not attend a prekindergarten program. For Research Questions 8, 10, and 12, I conducted a paired t-test to compare the December and May easyCBM screener scores of the students who attended the VPK program. For Research Questions 9, 11, and 13, I used a series of independent t-test to compare the gain scores from December to May of the students who attended the VPK program and those from Title 1 schools who did not attend a prekindergarten program. I compared the data from each year of the students who attended the VPK program and those from Title 1 schools who did not attend a prekindergarten program. All data were analyzed at the .05 level of significance.

Chapter Summary

The purpose of this quantitative study is to investigate if there is a difference between Tennessee's Voluntary Prekindergarten (VPK) program and kindergarten achievement. I compared the academic growth of students who attended a VPK program to students from Title 1 schools who did not attend a VPK program. The data measures of this study were identified as easyCBM December and May screener scores. The methodology focused on the site selection, population and sample as well

as a description of the population. It also includes data collection and data analysis strategies along with an assessment of quality and rigor.

Chapter 4. Findings

The purpose of this quantitative study is to investigate if there is a relationship between Tennessee's Voluntary Prekindergarten (VPK) program and kindergarten achievement. I compared the academic growth of those who attended a VPK program to students in Title 1 schools who did not attend a VPK program. Kindergarten gives the first easyCBM assessment in the second semester of school. I compared the easyCBM scores of the students who attended a VPK program those who did not attend a VPK program. This could reveal if attending the VPK program is related to the students' academic growth and the amount of intervention a student will need the second semester of kindergarten. I examined a population of 628 kindergarten students. A total of 280 students attended the VPK program and a total of 348 students attended a Title 1 school and did not attend a VPK program.

The performance excellence administrator and early childhood director of the school system collected the data and presented it to me on a password protected database. The performance excellence administrator pulled the easyCBM screener data. EasyCBM data were pulled for every kindergarten student. The easyCBM software compiles the data into a spreadsheet. The early childhood director pulled the rosters of the previous year's prekindergarten programs. The rosters were used to separate the students based on attendance of a VPK program, attendance of a Title 1 prekindergarten program, or no program. Once the students were separated the data was given to me without names or identifying markers. The data included the school attended, winter and spring easyCBM scores and student demographics. The breakdown of demographics are as follows: Of the 280 VPK students, 132 (47%) were

male and 148 (53%) were female; of the 348 Title 1 non-VPK students 160 (46%) were male and 188 (54%) were female. Of the 628 students 3% were Asian, 14% were Black/African American, 4% were Hispanic/Latino, and 79% were White not Hispanic/Latino. This information is illustrated in table 1 below. Once I received the spreadsheet with the unidentified data I transferred the data to SPSS and calculated gain scores then I ran a series of independent t-tests and paired t-tests. All data were stored on a password protected database and not compromised at any point.

Table 1

Demographic Data

Prekindergarten Participation	*N*	Proportion
VPK	280	
Title 1 – non-attending	348	
Total	628	
Gender		
VPK – Male	148	47%
VPK – Female	132	53%
Title 1 – non-attending – Male	160	46%
Title 1 – non-attending – Female	188	54%
Total	628	
Race		
Asian	17	3%
Black/ African American	87	14%
Hispanic/ Latino	25	4%
White, non-Hispanic/ Latino	499	79%
Total	628	

Research Question 1

1. Is there a significant difference in the December easyCBM screener scores in letter sounds (LS) between kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

$H_0$1: There is no significant difference in the December easyCBM screener scores in letter sounds (LS) between kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program.

An independent-samples t-test was conducted to evaluate whether significant differences were found in December easyCBM screener scores in letter sounds of kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program. The easyCBM scores was the test variable and the grouping variable was attendance of the Voluntary Pre-K program or Title 1 students who did not attend the Voluntary Pre-K program. The test was significant, $t(613) = 3.31$, $p = .001$. Therefore, the null hypothesis is rejected. Kindergarten students who attended a Voluntary Pre-K program ($M = 19.94$, $SD = 10.66$) tended to have significantly higher December easyCBM screener scores in letter sounds than students in Title 1 schools who did not attend the Voluntary Pre-K program ($M = 17.03$, $SD = 10.98$). The 95% confidence interval for the difference in means 1.18 to 4.64. The Cohen's d index was .27, which indicated a medium effect size. Figures 3 and 4 show the distribution for the two groups.

Figure 3

December EasyCBM Screener Scores for Letter Sounds

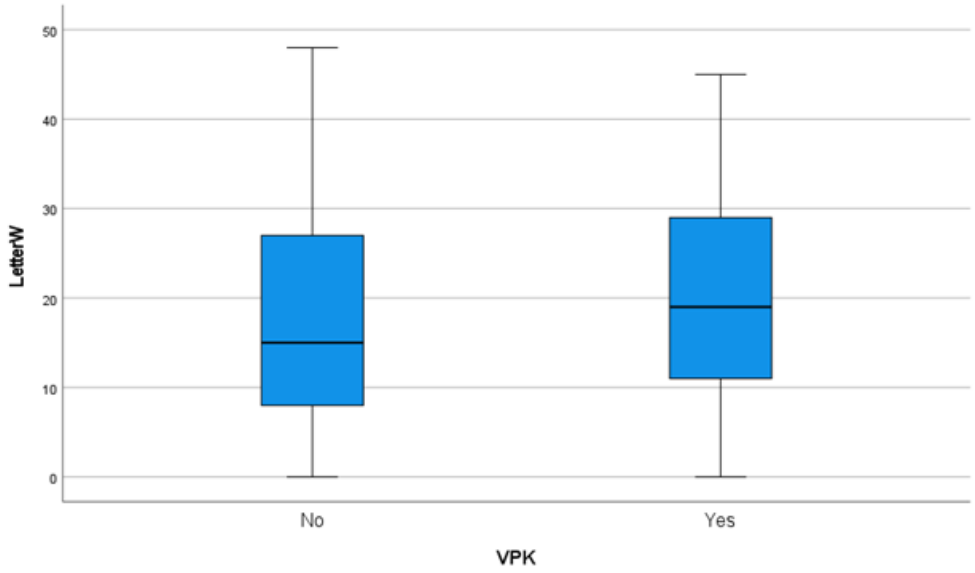
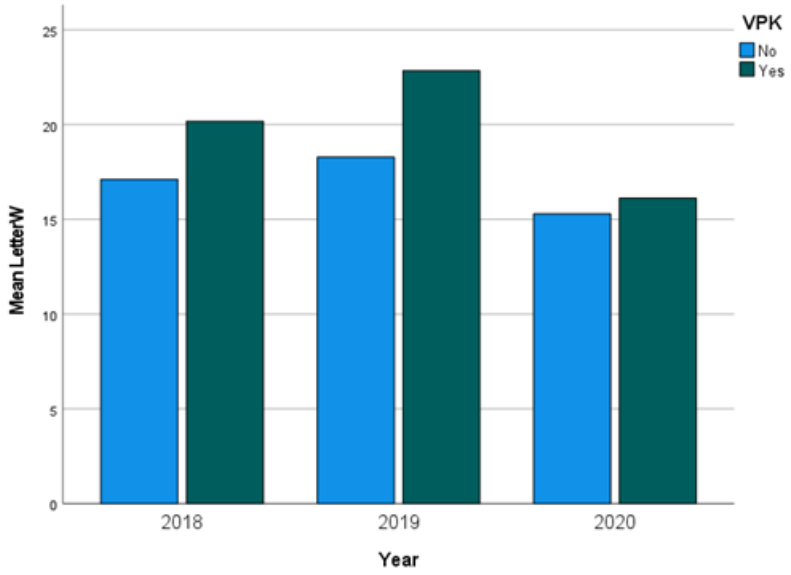


Figure 4

December EasyCBM Screener Scores for Letter Sounds



Research Question 2

2. Is there a significant difference in the December easyCBM screener scores in phoneme-segmenting (PS) between kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

$H_0$2: There is no significant difference in the December easyCBM screener scores in phoneme-segmenting (PS) between kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program.

An independent-samples t-test was conducted to evaluate whether significant differences were found in December easyCBM screener scores in phoneme-segmenting of kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program. The easyCBM scores was the test variable and the grouping variable was attendance of the Voluntary Pre-K program or Title 1 students who did not attend the Voluntary Pre-K program. The test was significant, $t(612) = 2.67$, $p = .008$. Therefore, the null hypothesis is rejected. Kindergarten students who attended a Voluntary Pre-K program ($M = 21.46$, $SD = 13.46$) tended to have significantly higher December easyCBM screener scores in phoneme-segmenting than students in Title 1 schools who did not attend the Voluntary Pre-K program ($M = 18.41$, $SD = 14.47$). The 95% confidence interval for the difference in means .811 to 5.295. The Cohen's d index was .22, which indicated a medium effect size. Figures 5 and 6 shows the distribution for the two groups.

Figure 5

December EasyCBM Screener Scores for Phoneme-Segmenting

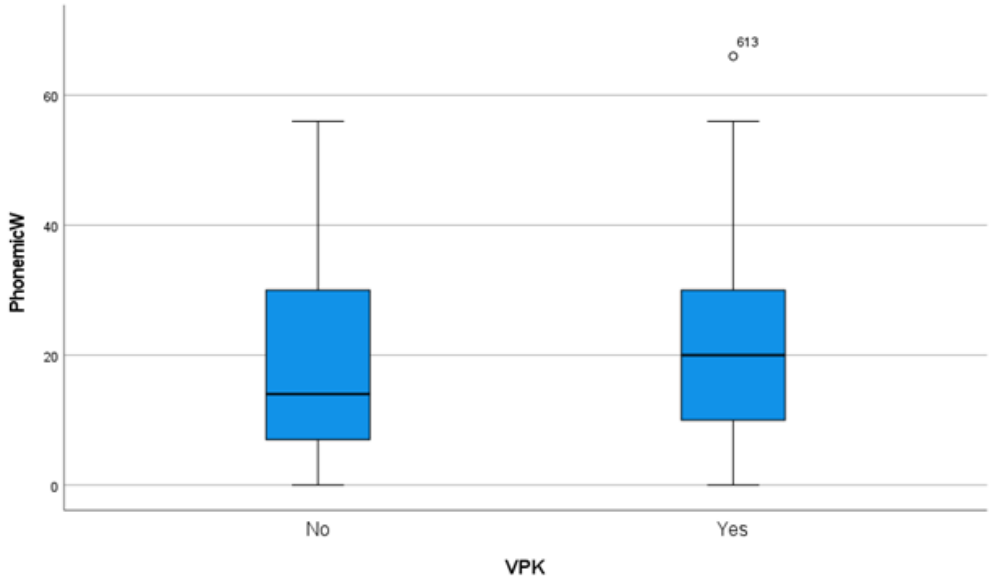
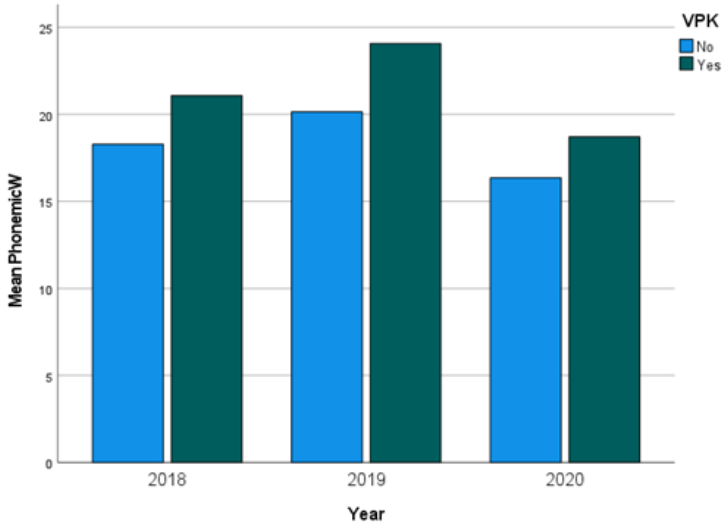


Figure 6

December EasyCBM Screener Scores for Phoneme-Segmenting



Research Question 3

3. Is there a significant difference in the December easyCBM screener scores in word reading frequency (WRF) between kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

$H_0$3: There is no significant difference in the December easyCBM screener scores in word reading frequency (WRF) between kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program.

An independent-samples t-test was conducted to evaluate whether significant differences were found in December easyCBM screener scores in word reading frequency of kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program. The easyCBM scores was the test variable and the grouping variable was attendance of the Voluntary Pre-K program or Title 1 students who did not attend the Voluntary Pre-K program. The test was not significant, $t(613) = .629$, $p = .529$. Therefore, the null hypothesis is retained. The Cohen's d index was .051 which indicated a small effect size. Kindergarten students who attended a Voluntary Pre-K program ($M = 4.23$, $SD = 3.58$) tended to have approximately the same December easyCBM screener scores in word reading frequency as students in Title 1 schools who did not attend the Voluntary Pre-K program ($M = 4.50$, $SD = 6.18$). The 95% confidence interval for the difference in means -1.096 to .564. Figures 7 and 8 shows the distribution for the two groups.

Figure 7

December EasyCBM Screener Scores for Word Reading Frequency

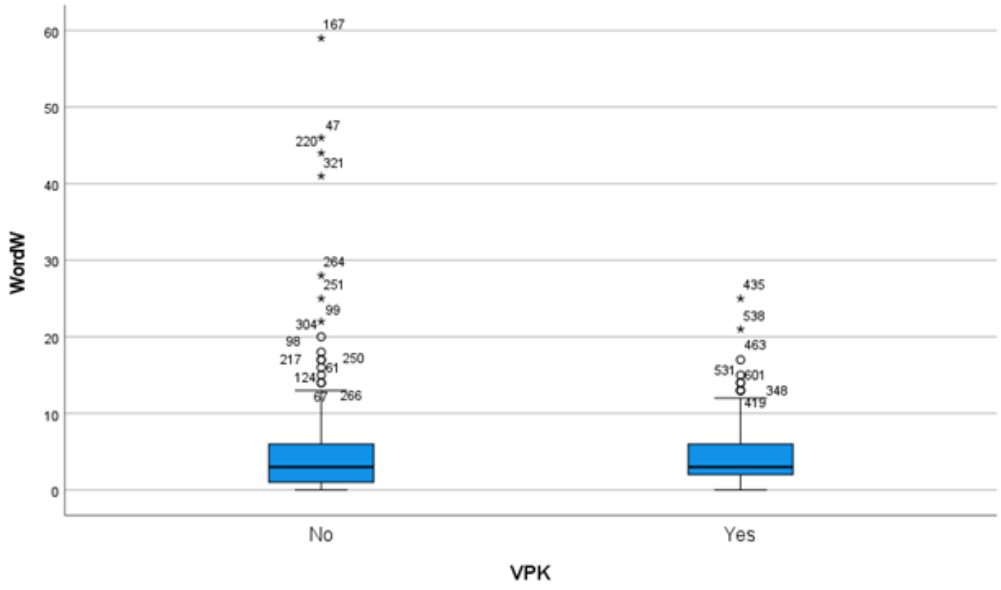
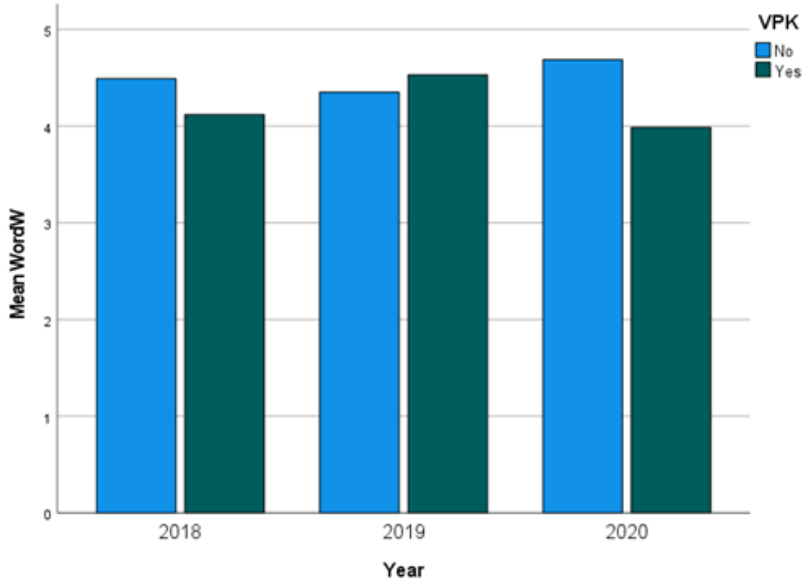


Figure 8

December EasyCBM Screener Scores for Word Reading Frequency



Research Question 4

4. Is there a significant difference in the December easyCBM screener scores in the math common core state standard (CCSS) between kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

$H_0$4: There is no significant difference in the December easyCBM screener scores in the math common core state standard (CCSS) between kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program.

An independent-samples t-test was conducted to evaluate whether significant differences were found in December easyCBM screener scores in the math common core state standard of kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program. The easyCBM scores was the test variable and the grouping variable was attendance of the Voluntary Pre-K program or Title 1 students who did not attend the Voluntary Pre-K program. The test was significant, $t(569) = 2.98$, $p = .003$. Therefore, the null hypothesis is rejected. Kindergarten students who attended a Voluntary Pre-K program ($M = 21.38$, $SD = 3.88$) tended to have significantly higher December easyCBM screener scores in the math common core state standard than students in Title 1 schools who did not attend the Voluntary Pre-K program ($M = 20.25$, $SD = 4.90$). The 95% confidence interval for the difference in means .382 to 1.864. The Cohen's d index was .25, which indicated a medium effect size. Figures 9 and 10 shows the distribution for the two groups.

Figure 9

December EasyCBM Screener Scores for Math Common Core State Standard

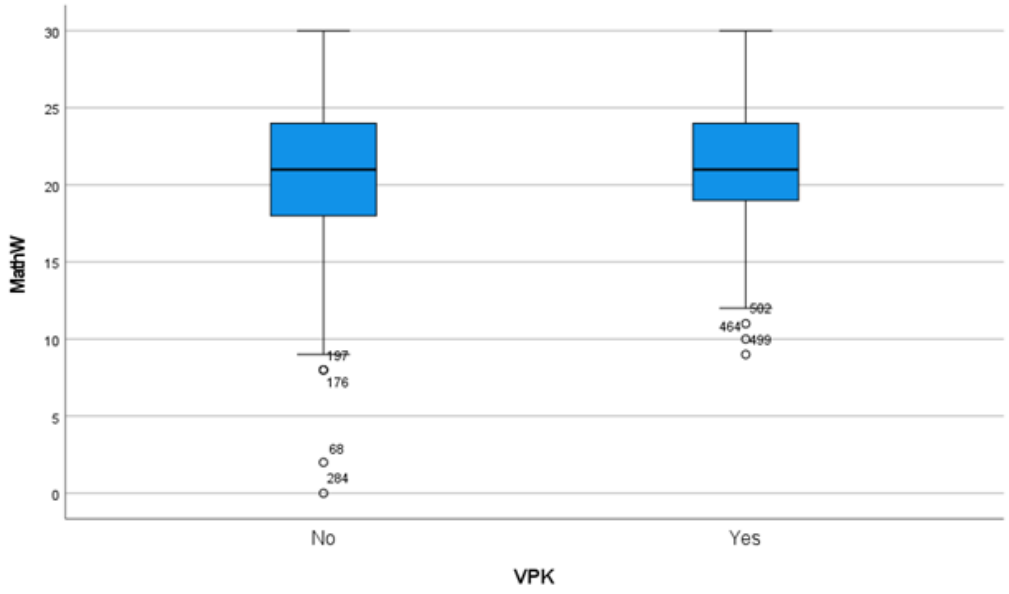
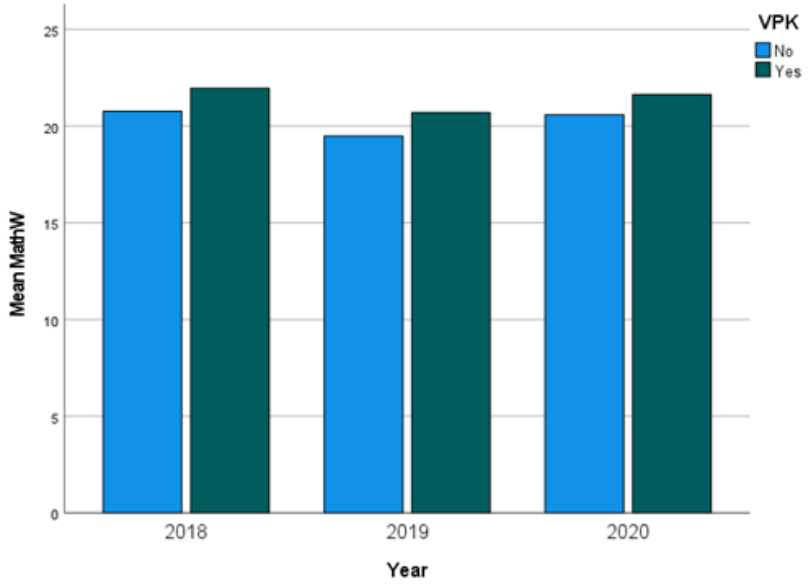


Figure 10

December EasyCBM Screener Scores for Math Common Core State Standard



Research Question 5

5. Is there a significant difference in the May easyCBM screener scores in letter sounds (LS) between kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

$H_0$5: There is no significant difference in the May easyCBM screener scores in letter sounds (LS) between kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program.

An independent-samples t-test was conducted to evaluate whether significant differences were found in May easyCBM screener scores in letter sounds of kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program. The easyCBM scores was the test variable and the grouping variable was attendance of the Voluntary Pre-K program or Title 1 students who did not attend the Voluntary Pre-K program. The test was significant, $t(389) = 1.98$, $p = .048$. Therefore, the null hypothesis is rejected. Kindergarten students who attended a Voluntary Pre-K program ($M = 32.13$, $SD = 12.00$) tended to have significantly higher May easyCBM screener scores in letter sounds than students in Title 1 schools who did not attend the Voluntary Pre-K program ($M = 29.63$, $SD = 12.49$). The 95% confidence interval for the difference in means .018 to 4.976. The Cohen's d index was .20, which indicated a small to medium effect size. Figures 11 and 12 show the distribution for the two groups.

Figure 11

May EasyCBM Screener Scores for Letter Sounds

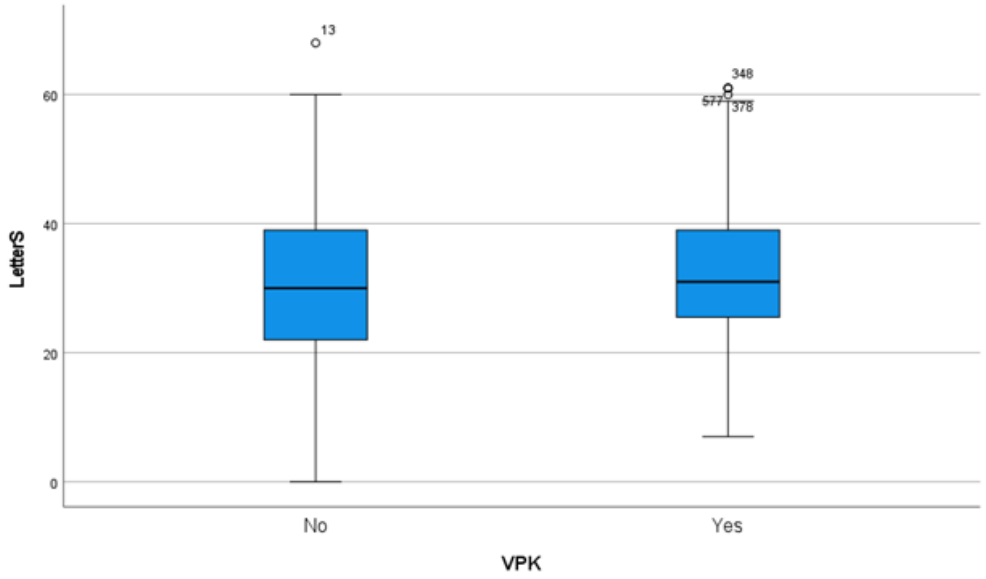
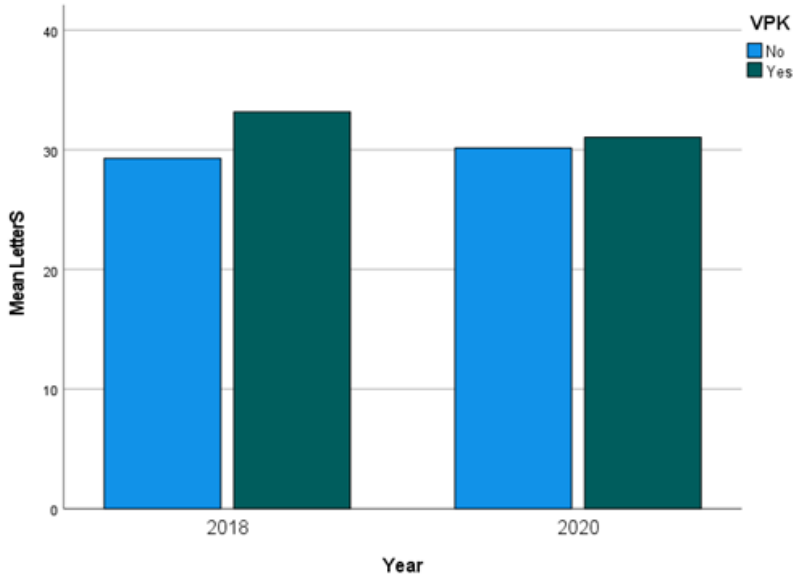


Figure 12

May EasyCBM Screener Scores for Letter Sounds



Research Question 6

6. Is there a significant difference in the May easyCBM screener scores in phoneme-segmenting (PS) between kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

$H_0$6: There is no significant difference in the May easyCBM screener scores in phoneme-segmenting (PS) between kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program.

An independent-samples t-test was conducted to evaluate whether significant differences were found in the May easyCBM screener scores in phoneme-segmenting of kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program. The easyCBM scores was the test variable and the grouping variable was attendance of the Voluntary Pre-K program or Title 1 students who did not attend the Voluntary Pre-K program. The test was not significant, $t(388) = .265$, $p = .791$. Therefore, the null hypothesis is retained. The Cohen's d index was .027 which indicated a small effect size. Kindergarten students who attended a Voluntary Pre-K program ($M = 31.92$, $SD = 13.12$) tended to have approximately the same May easyCBM screener scores in phoneme-segmenting as students in Title 1 schools who did not attend the Voluntary Pre-K program ($M = 32.31$, $SD = 14.94$). The 95% confidence interval for the difference in means -3.258 to 2.483. Figures 13 and 14 shows the distribution for the two groups.

Figure 13

May EasyCBM Screener Scores for Phoneme-Segmenting

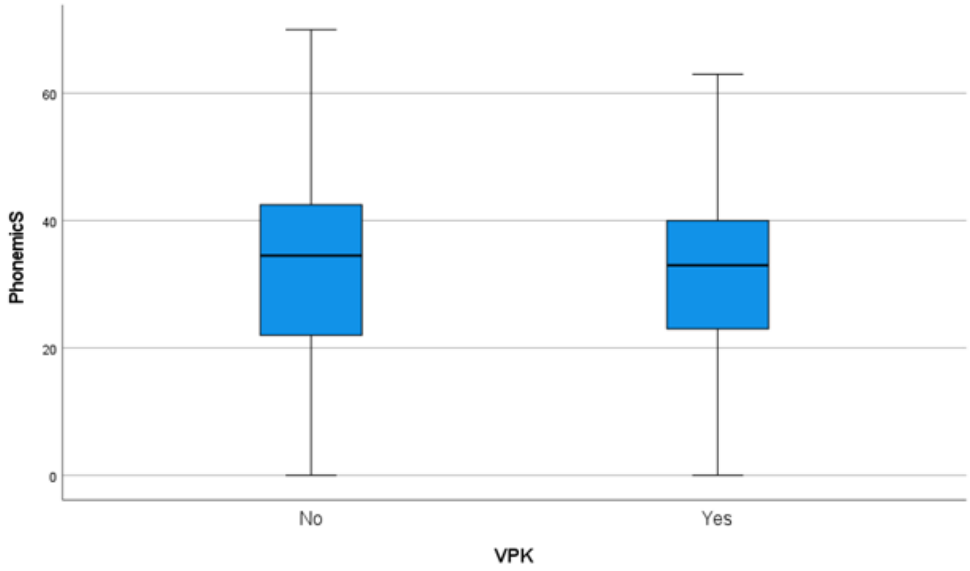
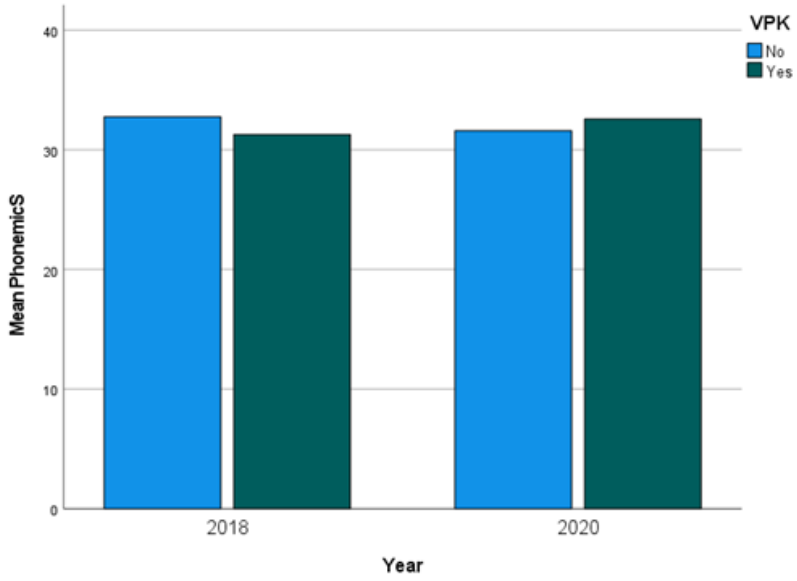


Figure 14

May EasyCBM Screener Scores for Phoneme-Segmenting



Research Question 7

7. Is there a significant difference in the May easyCBM screener scores in word reading frequency (WRF) between kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program?

$H_0$7: There is no significant difference in the May easyCBM screener scores in word reading frequency (WRF) between kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program.

An independent-samples t-test was conducted to evaluate whether significant differences were found in May easyCBM screener scores in word reading frequency of Kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program. The easyCBM scores was the test variable and the grouping variable was attendance of the Voluntary Pre-K program or Title 1 students who did not attend the Voluntary Pre-K program. The test was not significant, $t(398) = .403$, $p = .687$. Therefore, the null hypothesis is retained. The Cohen's d index was .041 which indicated a small effect size. Kindergarten students who attended a Voluntary Pre-K program ($M = 13.16$, $SD = 10.08$) tended to have approximately the same May easyCBM screener scores in word reading frequency as students in Title 1 schools who did not attend the Voluntary Pre-K program ($M = 13.64$, $SD = 12.88$). The 95% confidence interval for the difference in means -2.814 to 1.856. Figures 15 and 16 shows the distribution for the two groups.

Figure 15

May EasyCBM Screener Scores for Word Reading Frequency

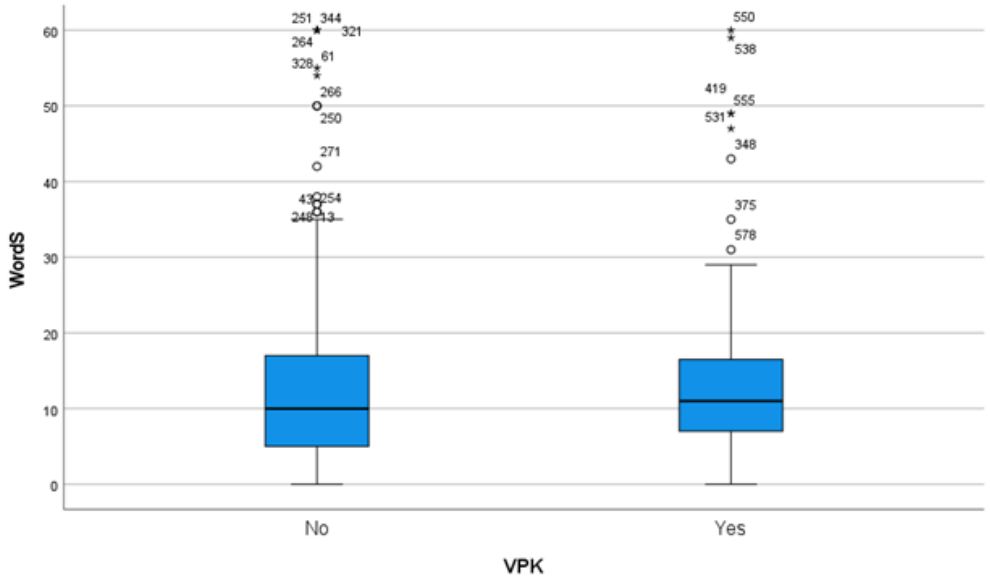
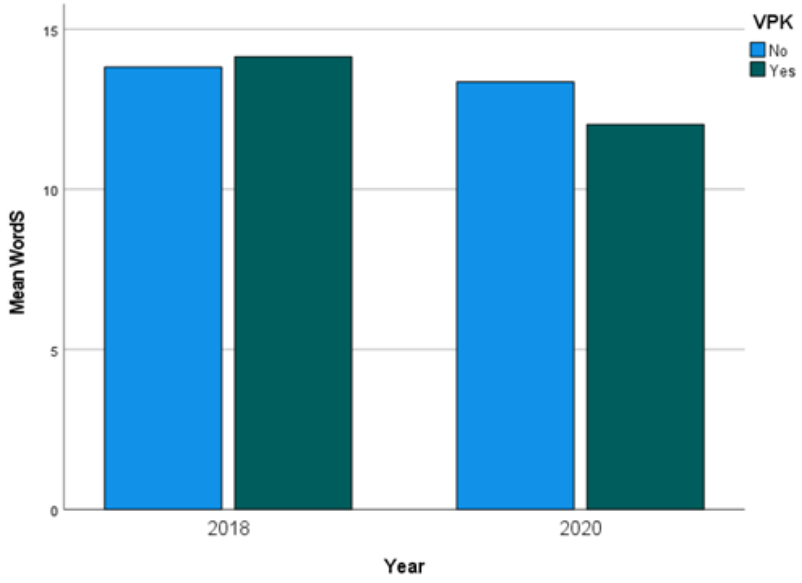


Figure 16

May EasyCBM Screener Scores for Word Reading Frequency



Research Question 8

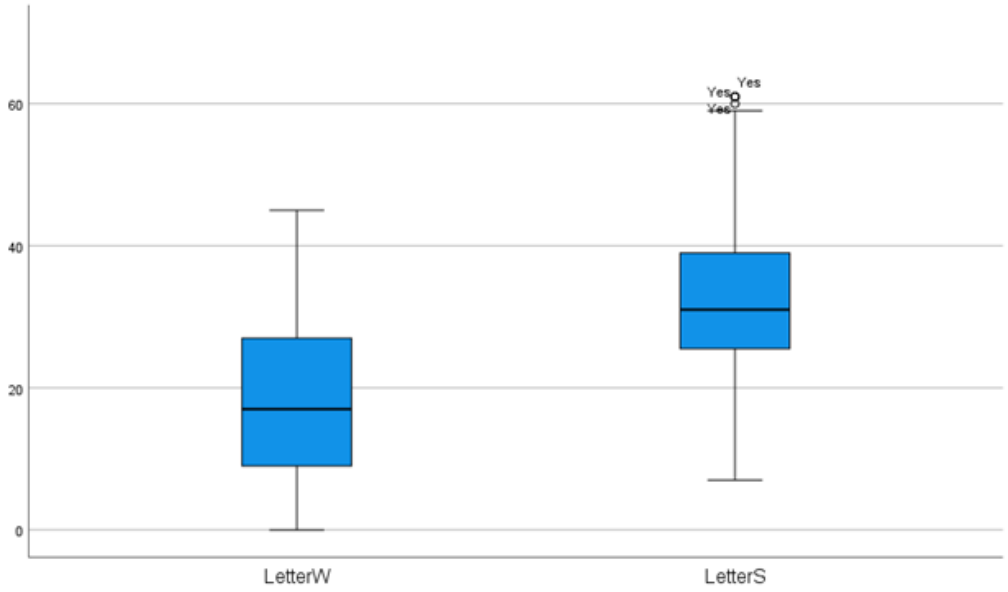
8. Is there a significant difference in the easyCBM screener scores in letter sounds (LS) of VPK students taking the test in December and the scores of the same students taking the test again in May?

$H_0$8: There is no significant difference in the easyCBM screener scores in letter sounds (LS) of VPK students taking the test in December and the scores of the same students taking the test again in May.

A paired t-test was conducted to evaluate whether significant differences were found in December and May easyCBM screener scores in the letter sounds of kindergarten students who attended the Volunteer Pre-K program. The December easyCBM scores was the first variable and the second variable was May easyCBM scores of the same students. The test was significant, $t(162) = 18.33$, $p < .001$. Therefore, the null hypothesis is rejected. Kindergarten students who attended a Voluntary Pre-K program tended to score significantly higher on the May easyCBM screener scores ($M = 32.13$, $SD = 12.00$) in letter sounds than on the December easyCBM screener scores ($M = 18.11$, $SD = 10.60$). The 95% confidence interval for the difference in means 12.508 to 15.529. The Cohen's d index was 1.436, which indicated a large effect size. Figure 17 shows the distribution for the two tests.

Figure 17

VPK December and May Letter Sounds EasyCBM Screener Scores



Research Question 9

9. In Title I schools, is there a significant difference in easyCBM gain scores from December to May in letter sounds (LS) of kindergarten students who attended the Volunteer Pre-K program and kindergarten students who did not attend the program?

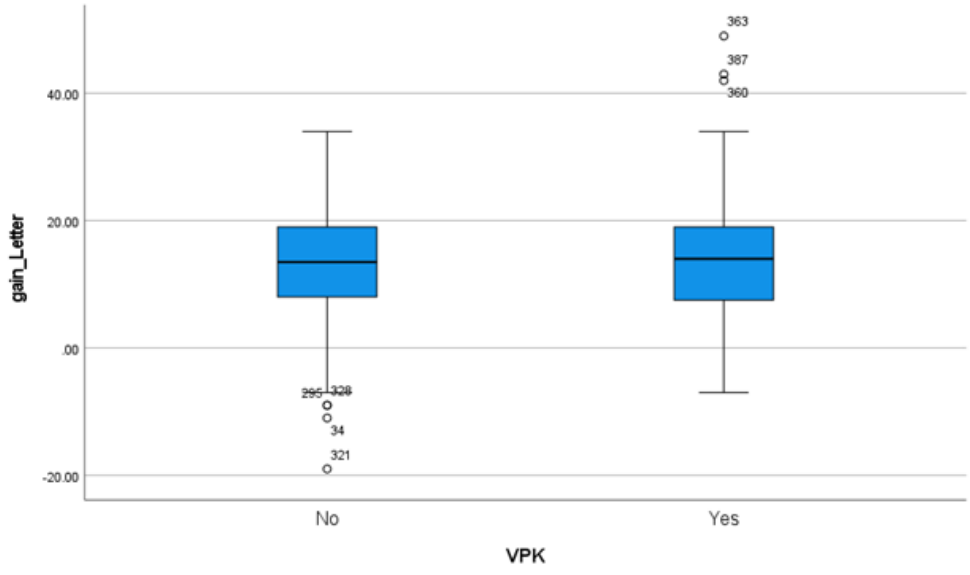
$H_0$9: In Title I schools, there is no significant difference in easyCBM gain scores from December to May in letter sounds (LS) of kindergarten students who attended the Volunteer Pre-K program and kindergarten students who did not attend the program.

An independent-samples t-test was conducted to evaluate whether significant differences were found in the easyCBM screener gain scores in letter sounds of kindergarten students who attended the Volunteer Pre-K program and students in Title

1 schools who did not attend the Volunteer Pre-K program. The easyCBM gain scores was the test variable and the grouping variable was attendance of the Voluntary Pre-K program or Title 1 students who did not attend the Voluntary Pre-K program. The test was not significant, t(389) = .812, p = .417. Therefore, the null hypothesis is retained. The Cohen's d index was .083 which indicated a small effect size. Kindergarten students who attended a Voluntary Pre-K program (M = 14.02, SD = 9.76) tended to increase approximately the same on the December to May easyCBM screener gain scores in letter sounds as students in Title 1 schools who did not attend the Voluntary Pre-K program (M = 13.24, SD = 9.01). The 95% confidence interval for the difference in means -1.104 to 2.659. Figure 18 shows the distribution for the two groups.

Figure 18

EasyCBM Letter Sound Gain Scores for VPK and Title 1 Non-VPK



Research Question 10

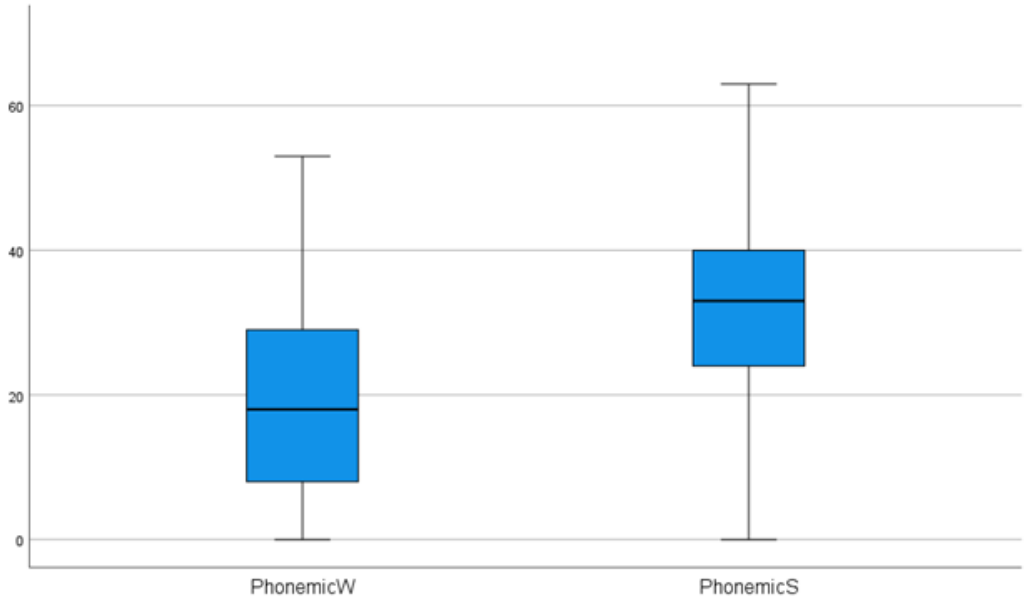
10. Is there a significant difference in the easyCBM screener scores in phoneme-segmenting (PS) of VPK students taking the test in December and the scores of the same students taking the test again in May?

$H_0$10: There is no significant difference in the easyCBM screener scores in phoneme-segmenting (PS) of VPK students taking the test in December and the scores of the same students taking the test again in May?

A paired t-test was conducted to evaluate whether significant differences were found in December and May easyCBM screener scores in phoneme-segmenting of kindergarten students who attended the Volunteer Pre-K program. The December easyCBM scores was the first variable and the second variable was May easyCBM scores of the same students. The test was significant, $t(160) = 12.37$, $p < .001$. Therefore, the null hypothesis is rejected. Kindergarten students who attended a Voluntary Pre-K program tended to score significantly higher on the May easyCBM screener scores ($M = 32.00$, $SD = 13.12$) in letter sounds than on the December easyCBM screener scores ($M = 19.54$, $SD = 12.81$). The 95% confidence interval for the difference in means 12.508 to 15.529. The Cohen's d index was .975, which indicated a medium effect size. Figure 19 shows the distribution for the two tests.

Figure 19

VPK December and May Phoneme-Segmenting EasyCBM Screener Scores



Research Question 11

11. In Title I schools, is there a significant difference in easyCBM gain scores from December to May in phoneme-segmenting (PS) of kindergarten students who attended the Volunteer Pre-K program and kindergarten students who did not attend the program?

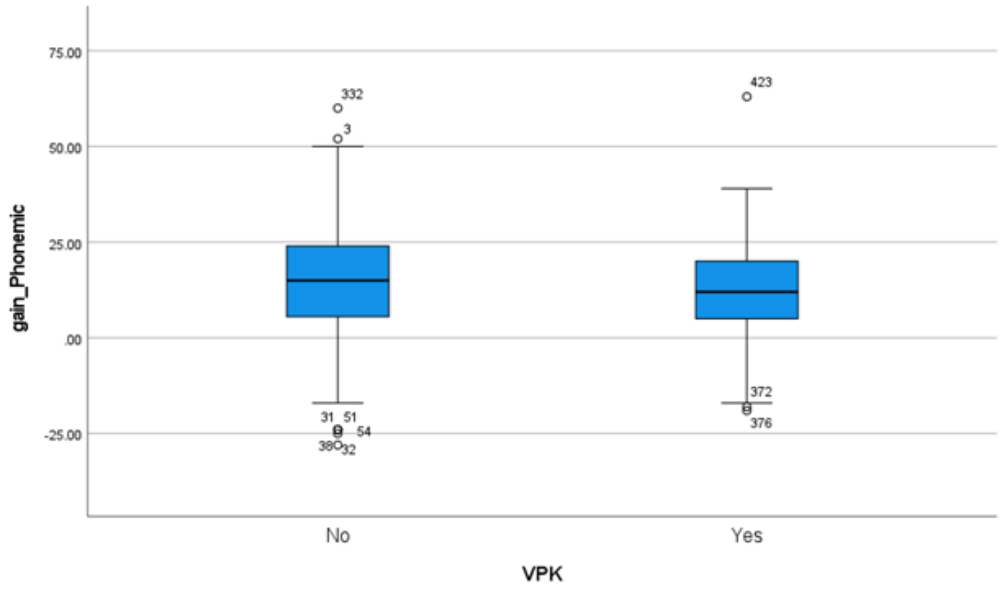
$H_0$11: In Title I schools, there is no significant difference in easyCBM gain scores from December to May in phoneme-segmenting (PS) of kindergarten students who attended the Volunteer Pre-K program and kindergarten students who did not attend the program.

An independent-samples t-test was conducted to evaluate whether significant differences were found in the easyCBM screener gain scores in phoneme-segmenting

of kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program. The easyCBM gain scores was the test variable and the grouping variable was attendance of the Voluntary Pre-K program or Title 1 students who did not attend the Voluntary Pre-K program. The test was not significant, t(387) = 1.643, p = .101. Therefore, the null hypothesis is retained. The Cohen's d index was .169 which indicated a small effect size. Kindergarten students who attended a Voluntary Pre-K program (M = 12.46, SD = 12.78) tended to increase approximately the same on the December to May easyCBM screener gain scores in phoneme-segmenting as students in Title 1 schools who did not attend the Voluntary Pre-K program (M = 14.79, SD = 14.40). The 95% confidence interval for the difference in means -5.108 to .457. Figure 20 shows the distribution for the two groups.

Figure 20

EasyCBM Phoneme-Segmenting Gain Scores for VPK and Title Non-VPK



Research Question 12

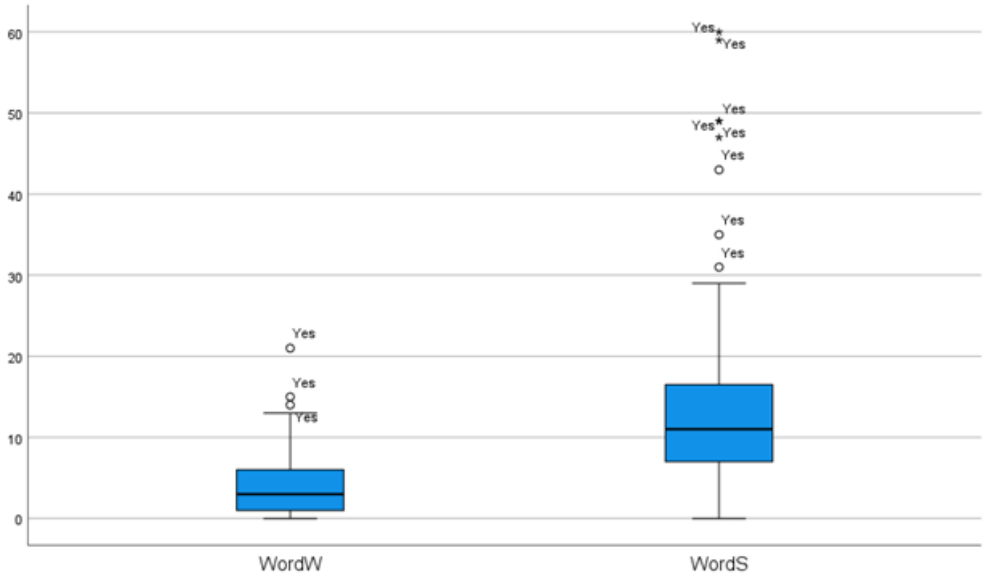
12. Is there a significant difference in the easyCBM screener scores in word reading frequency (WRF) of VPK students taking the test in December and the scores of the same students taking the test again in May?

$H_0$12: There is no significant difference in the easyCBM screener scores in word reading frequency (WRF) of VPK students taking the test in December and the scores of the same students taking the test again in May.

A paired t-test was conducted to evaluate whether significant differences were found in December and May easyCBM screener scores in word reading frequency of kindergarten students who attended the Volunteer Pre-K program. The December easyCBM scores was the first variable and the second variable was May easyCBM scores of the same students. The test was significant, $t(171) = 15.37$, $p < .001$. Therefore, the null hypothesis is rejected. Kindergarten students who attended a Voluntary Pre-K program tended to score significantly higher on the May easyCBM screener scores ($M = 13.16$, $SD = 10.08$) in letter sounds than on the December easyCBM screener scores ($M = 4.06$, $SD = 3.51$). The 95% confidence interval for the difference in means 7.930 to 10.268. The Cohen's d index was 1.172, which indicated a large effect size. Figure 21 shows the distribution for the two tests.

Figure 21

VPK December and May Word Reading Frequency EasyCBM Screener Scores



Research Question 13

13. In Title I schools, is there a significant difference in easyCBM gain scores from December to May in word reading frequency (WRF) of kindergarten students who attended the Volunteer Pre-K program and kindergarten students who did not attend the program?

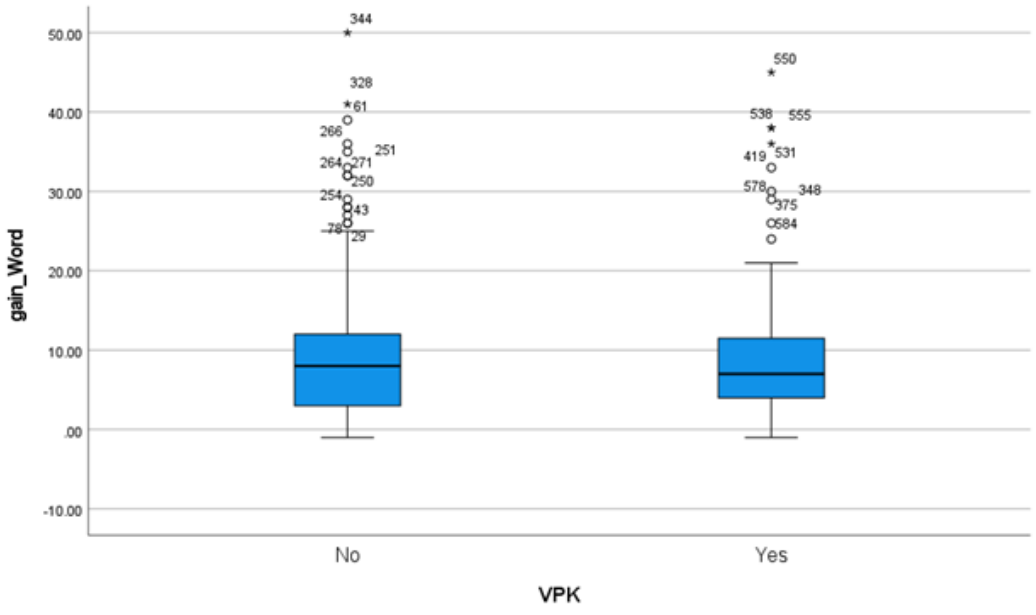
$H_0$13: In Title I schools, there is no significant difference in easyCBM gain scores from December to May in word reading frequency (WRF) of kindergarten students who attended the Volunteer Pre-K program and kindergarten students who did not attend the program.

An independent-samples t-test was conducted to evaluate whether significant differences were found in the easyCBM screener gain scores in word reading frequency

of kindergarten students who attended the Volunteer Pre-K program and students in Title 1 schools who did not attend the Volunteer Pre-K program. The easyCBM gain scores was the test variable and the grouping variable was attendance of the Voluntary Pre-K program or Title 1 students who did not attend the Voluntary Pre-K program. The test was not significant, t(398) = .040, p = .968. Therefore, the null hypothesis is retained. The Cohen's d index was .004 which indicated a small effect size. Kindergarten students who attended a Voluntary Pre-K program (M = 9.10, SD = 7.77) tended to increase approximately the same on the December to May easyCBM screener gain scores in word reading frequency as students in Title 1 schools who did not attend the Voluntary Pre-K program (M = 9.07, SD = 8.46). The 95% confidence interval for the difference in means -1.589 to 1.655. Figure 22 shows the distribution for the two groups.

Figure 22

EasyCBM Word Reading Frequency Gain Scores for VPK and Title Non-VPK



Chapter 5. Conclusion

This chapter contains a discussion of the findings, implications for practice, recommendations for future research, and a summary of the study. The purpose of this quantitative study was to investigate if there is a relationship between Tennessee's Voluntary Prekindergarten (VPK) program and kindergarten achievement. I compared the academic growth of who attended a VPK program to students in Title 1 schools who did not attend a VPK program. Kindergarten gives the first easyCBM assessment in the second semester of school. I compared the easyCBM scores of the students who attended a VPK program to the scores of students who did not attend a VPK program. This could reveal if attending the VPK program is related to the students' academic growth and the amount of intervention a student will need the second semester of kindergarten.

Discussion

Children born into poverty start school academically behind their non-impoverished peers (Pearman ll & Stanford University, 2020; Reardon & Portilla, 2016). In addition to their initial deficits, children from poverty face the growing barrier of ever-increasing rigor in most kindergarten programs (Bassok et al., 2016; Repko-Erwin, 2017). The Tennessee Voluntary Pre-K (VPK) program was designed to help children in poverty to begin kindergarten on the same academic level as their non-impoverished peers. This study looked at kindergarten students who attend a Voluntary Pre-K program and students from Title 1 schools who did not attend a Voluntary Pre-K program. The instrumentation used was a Curriculum-Based Measurement (CBM) screener called easyCBM. The Curriculum-Based Measurement is a technology-based

screener used in the Response to Intervention (RTI) three-tiered approach to intervention. It is used “for the purpose of identifying who should be the target of continued monitoring and attention, for quantifying responsiveness to intervention among those targeted for monitoring, and for tailoring individualized instructional programs for the most unresponsive subset of children” (Fuchs & Fuchs, 2007, pp. 29-30). The kindergarten student’s performance on the easyCBM screener would indicate if a student would need more intervention in a particular subject area.

Research Question 1 addressed the December easyCBM letter sounds screener scores for kindergarteners. The findings showed that there is a significant difference in the December easyCBM letter sounds screener scores of kindergarten students who attended a Voluntary Pre-K program and students in Title 1 schools who did not attend a Voluntary Pre-K program. Kindergarten students who attended a Voluntary Pre-K program tended to do better on the December easyCBM screener scores in letter sounds than students in Title 1 schools who did not attend the Voluntary Pre-K program. The findings suggest the semester of kindergarten was not sufficient to academically advance the Title 1 students who did not attend a Voluntary Pre-K program, in letter sounds, to students who did attend a Voluntary Pre-K program. The scores suggest the Title 1 students who did not attend a Voluntary Pre-K program would require more intervention for letter sounds.

Research Question 2 addressed the December easyCBM phoneme-segmenting screener scores for kindergarteners. The findings showed that there is a significant difference in the December easyCBM phoneme-segmenting screener scores of kindergarten students who attended a Voluntary Pre-K program and students in Title 1

schools who did not attend a Voluntary Pre-K program. Kindergarten students who attended a Voluntary Pre-K program tended to do better on the December easyCBM screener scores in phoneme-segmenting than students in Title 1 schools who did not attend the Voluntary Pre-K program. The findings suggest the semester of kindergarten was not sufficient to academically advance the Title 1 students who did not attend a Voluntary Pre-K program, in phoneme-segmenting, to students who did attend a Voluntary Pre-K program. The scores suggest the Title 1 students who did not attend a Voluntary Pre-K program would require more intervention for phoneme-segmenting.

Research Question 3 addressed the December easyCBM word reading frequency screener scores for kindergarteners. The findings showed that there was not a significant difference in the December easyCBM word reading frequency screener scores of kindergarten students who attended a Voluntary Pre-K program and students in Title 1 schools who did not attend a Voluntary Pre-K program. Kindergarten students who attended a Voluntary Pre-K program tended to perform the same on the easyCBM word reading frequency screener scores as Title 1 students who did not attend a Voluntary Pre-K program. The findings suggest the semester of kindergarten was sufficient to academically advance the Title 1 students, in word reading frequency, to the Voluntary Pre-k students. They would require the same amount of intervention in word reading frequency. This makes sense because word reading frequency is not a part of the prekindergarten curriculum.

Research Question 4 addressed the December easyCBM math common core state standard screener scores for kindergarteners. The findings showed that there is a significant difference in the December easyCBM math common core state standard

screener scores of kindergarten students who attended a Voluntary Pre-K program and students in Title 1 schools who did not attend a Voluntary Pre-K program. Kindergarten students who attended a Voluntary Pre-K program tended to do better on the December easyCBM in math common core state standard screener scores than students in Title 1 schools who did not attend the Voluntary Pre-K program. The findings suggest the semester of kindergarten was not sufficient to academically advance the Title 1 students who did not attend a Voluntary Pre-K program, in math common core state standard scores, to students who did attend a Voluntary Pre-K program. The scores suggest the Title 1 students who did not attend a Voluntary Pre-K program would require more intervention for math common core state standard skills.

"Response to Intervention (RTI) is a model for the early identification and prevention of reading disabilities" (Catts et al., 2015, p. 281). If this model is implemented correctly children can be identified early if they have a learning or reading disability. This model uses focused interventions and instruction based on scientific research. The model begins with all the kindergarten or first grade students participating in a universal screener. The screener identifies children who are at risk for reading or learning disabilities. The universal screener used in this study was the easyCBM screener. Unfortunately the data were not complete for all 3 years for all subtests. Due to the interference of COVID-19, data were not completed for an entire year. Discussion is based on the most accurate and available data.

Research Question 5 addressed the May easyCBM letter sounds screener scores for kindergarteners. The findings showed that there is a significant difference in the May easyCBM letter sounds screener scores of kindergarten students who attended

a Voluntary Pre-K program and students in Title 1 schools who did not attend a Voluntary Pre-K program. Kindergarten students who attended a Voluntary Pre-K program tended to do better on the May easyCBM screener scores in letter sounds than students in Title 1 schools who did not attend the Voluntary Pre-K program. The findings suggest the year of kindergarten with one semester of intense focused intervention was not sufficient to academically advance the Title 1 students who did not attend a Voluntary Pre-K program to students who did attend a Voluntary Pre-K program.

Research Question 6 addressed the May easyCBM phoneme-segmenting screener scores for kindergarteners. The findings showed that there is not a significant difference in the May easyCBM phoneme-segmenting screener scores of kindergarten students who attended a Voluntary Pre-K program and students in Title 1 schools who did not attend a Voluntary Pre-K program. Kindergarten students who attended a Voluntary Pre-K program tended to do the same on the May easyCBM screener scores in phoneme-segmenting as students in Title 1 schools who did not attend the Voluntary Pre-K program. The findings suggest the year of kindergarten with one semester of intense focused intervention was sufficient to advance academically the Title 1 students who did not attend a Voluntary Pre-K program to students who did attend a Voluntary Pre-K program.

Research Question 7 addressed the May easyCBM word reading frequency screener scores for kindergarteners. The findings showed that there is not a significant difference in the May easyCBM word reading frequency screener scores of kindergarten students who attended a Voluntary Pre-K program and students in Title 1 schools who did not attend a Voluntary Pre-K program. Kindergarten students who attended a

Voluntary Pre-K program tended to do the same on the May easyCBM screener scores in word reading frequency as students in Title 1 schools who did not attend the Voluntary Pre-K program. The findings suggest the year of kindergarten with one semester of intense focused intervention was sufficient to advance the Title 1 students who did not attend a Voluntary Pre-K program to students who did attend a Voluntary Pre-K program in word reading frequency.

In the Vanderbilt study, Lipsey et al. (2015) theorized stagnation was the reason Voluntary Pre-K students did not maintain their academic gains over their peers. They hypothesized the teachers were spending so much time catching up the students who did not attend the Voluntary Pre-K program, that the Voluntary Pre-K students were not being challenged and remained stagnant. Therefore, allowing their peers to catch up to them academically. Pearman ll et al. (2020) investigated the same data from the Vanderbilt study and looked at the academic gains of the Voluntary Pre-K participants. They found Voluntary Pre-K students made significant academic gains when they were exposed to a high-quality prekindergarten program and a high-quality school.

Research Question 8 addressed the December and May easyCBM letter sounds screener scores of kindergarten students who attended a Voluntary Pre-K program. The findings show there is a significant difference in the December and May easyCBM letter sounds screener scores. Kindergarten students who attended a Voluntary Pre-K program tended to do better on the May easyCBM screener scores in letter sounds than on the December easyCBM screener scores. The findings indicated the VPK students were able to make significant gains and did not remain academically stagnant in letter sounds.

Research Question 9 addressed the December and May easyCBM screener gain scores in letter sounds for kindergarteners who attended a Voluntary Pre-K program and students in Title 1 schools who did not attend a Voluntary Pre-K program. The findings showed that there is not a significant difference in the December and May easyCBM screener gain scores in letter sounds. Kindergarten students who attended a Voluntary Pre-K program tended to do the same on the easyCBM screener gain scores in letter sounds as students in Title 1 schools who did not attend the Voluntary Pre-K program. The findings indicate both the VPK students and the Title 1 students who did not attend a VPK program were able to make academic gains at the same rate.

Research Question 10 addressed the December and May easyCBM phoneme-segmenting screener scores of kindergarten students who attended a VPK program. The findings show there is a significant difference in the December and May easyCBM phoneme-segmenting screener scores. Kindergarten students who attended a Voluntary Pre-K program tended to do better on the May easyCBM screener scores in phoneme-segmenting than on the December easyCBM screener scores. The findings indicated the Voluntary Pre-K students were able to make significant gains and did not remain academically stagnant in phoneme-segmenting.

Research Question 11 addressed the December and May easyCBM screener gain scores in phoneme-segmenting for kindergarteners who attended a Voluntary Pre-K program and students in Title 1 schools who did not attend a Voluntary Pre-K program. The findings showed that there is not a significant difference in the December and May easyCBM screener gain scores in phoneme-segmenting. Kindergarten students who attended a Voluntary Pre-K program tended to do the same on the

easyCBM screener gain scores in phoneme-segmenting as students in Title 1 schools who did not attend the Voluntary Pre-K program. The findings indicate both the Voluntary Pre-K students and the Title 1 students who did not attend a Voluntary Pre-K program were able to make gains in phoneme-segmenting at the same rate.

Research Question 12 addressed the December and May easyCBM word reading frequency screener scores of kindergarten students who attended a VPK program. The findings show there is a significant difference in the December and May easyCBM word reading frequency screener scores. Kindergarten students who attended a Voluntary Pre-K program tended to do better on the May easyCBM screener scores in word reading frequency than on the December easyCBM screener scores. The findings indicated the Voluntary Pre-K students were able to make significant gains and did not remain academically stagnant in word reading frequency.

Research Question 13 addressed the December and May easyCBM screener gain scores in word reading frequency for kindergarteners who attended a Voluntary Pre-K program and students in Title 1 schools who did not attend a Voluntary Pre-K program. The findings showed that there is not a significant difference in the December and May easyCBM screener gain scores in word reading frequency. Kindergarten students who attended a Voluntary Pre-K program tended to do the same on the easyCBM screener gain scores in word reading frequency as students in Title 1 schools who did not attend the Voluntary Pre-K program. The findings indicate both the Voluntary Pre-K students and the Title 1 students who did not attend a Voluntary Pre-K program were able to make academic gains at the same rate.

The results of Research Questions 8 through 13 suggest the kindergarten students who attended a Voluntary Pre-K were able to make significant academic gains. In regard to letter sounds and word reading frequency the Voluntary Pre-K students started higher and made higher gains. The results of Research Questions 1 through 4 suggest kindergarten students who attended a Voluntary Pre-K program began the second half of the semester with significantly higher academic scores than students in Title 1 schools who did not attend a Voluntary Pre-K program. Therefore, the academic gains should have been significantly different between the Voluntary Pre-K participants and non-Voluntary Pre-K participants. The appearance of COVID-19 hindered an accurate assessment of the academic gains the second semester of kindergarten.

Implications for Practice

The implications I found for practice would include guidance for the federal and state departments of education and the upper-east Tennessee school system. I would recommend the federal and state departments evaluate the school systems that the students in prekindergarten programs will attend. They should require the school systems to compel vertical alignment of the prekindergarten curriculum with the elementary, middle and high school curriculum. Federal and state departments should provide increased funding for quality and effective professional development for teachers and assistants of the systems prekindergarten students will attend. Federal and state departments should increase funding for early childhood education. This funding will help to provide the training needed to maintain the high quality programs required to sustain the students' academic gains. I would recommend the upper-east Tennessee school system evaluate how phoneme-segmenting is being taught in

kindergarten. This was the only subtest where the Voluntary Pre-K students started ahead but the Title 1 non-participants were able to catch up. Lastly, I would recommend the upper-east Tennessee school system maintain Response to Intervention (RTI) data for future analysis.

Recommendations for Future Research

My recommendations for future research would involve longitudinal studies. Researchers should consider a longitudinal study of just prekindergarten students coming from high-quality prekindergarten programs going in to high-quality school systems. This study should include major milestone standardized assessment tools including but not limited to; TNReady, ACT, and high school end of course exams for algebra and English. The appearance of COVID-19 was a limitation to this particular study. One done without the interference of a pandemic would help show the significance of the prekindergarten programs.

Researchers should also consider a longitudinal prekindergarten study of racial subgroups; African-American, Hispanic, and Native American. It should include graduation rate, enrollment and graduation of college, and home ownership. Upon researching the literature for this study, I came across multiple studies involving the African-American subgroup. The research looked at arrest and pregnancy rates instead of how they used the education they received. Further research should be conducted to determine if the education of these subgroups is enhanced in an academically positive way by investigating GPA, graduation from college or technical school, rate of entrepreneurship, and community involvement and outreach.

Summary

I compared the academic growth of kindergarten students who attended a Voluntary Pre-K program to students in Title 1 schools who did not attend a Voluntary Pre-K program. The Voluntary Pre-K performed significantly better on the December easyCBM letter sounds, phoneme-segmenting, and math common core state standards screener scores. There was no significant difference in the December easyCBM word reading frequency screener scores. The Voluntary Pre-K students performed significantly better on the May easyCBM letter sounds screener scores. There was no significant difference in the May easyCBM phoneme-segmenting and word reading frequency screener scores. The Voluntary Pre-K students made significant gains from the December easyCBM scores to the May easyCBM scores. There was not a significant difference in the gain scores of the Voluntary Pre-K students and the Title 1 students who did not attend a Voluntary Pre-K program.

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